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AUTOSPORT

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18 MARCH 2021

MURRAY WALKER

———— **1923-2021** ————

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Farewell and thank you to a genuine motorsport legend

How many fans discovered and enjoyed motorsport thanks to Murray Walker? The answer must be in the millions. Not only did his career stretch back to before the Formula 1 world championship began, but his infectious enthusiasm and perfect commentary voice made him an intrinsic part of motorsport's coverage and growth.

That helps to explain why so many tributes, from not only those working in the sport (page 8) but also the scores of enthusiasts (p19), have poured in since news of Murray's passing broke last weekend (p4). He was one of those few figures in the public eye that no one seems to have anything negative to say about.

Even Walker's famous mistakes – my personal favourite is, perhaps, “The lead car is unique, except for the one behind it, which is identical” – became part of his charm. And could help produce some classic moments when Walker was matched with excellent co-commentators in the forms of ex-F1 drivers James Hunt or Martin Brundle.

While Murray will be best remembered by most for his F1 coverage, it should not be forgotten that his knowledge and passion extended to many other areas of motorsport, including motorbikes and the British Touring Car Championship, which he helped raise the profile of in the late 1980s and early 1990s (“The car upside-down is a Toyota!”).

It's a cliché to say there won't be another like him, but in this case it's true. Thank you for the many, many memories, Murray.



Kevin Turner

Kevin Turner
Chief Editor

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**NEXT WEEK
25 MARCH**

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Alastair Staley/Motorsport Images

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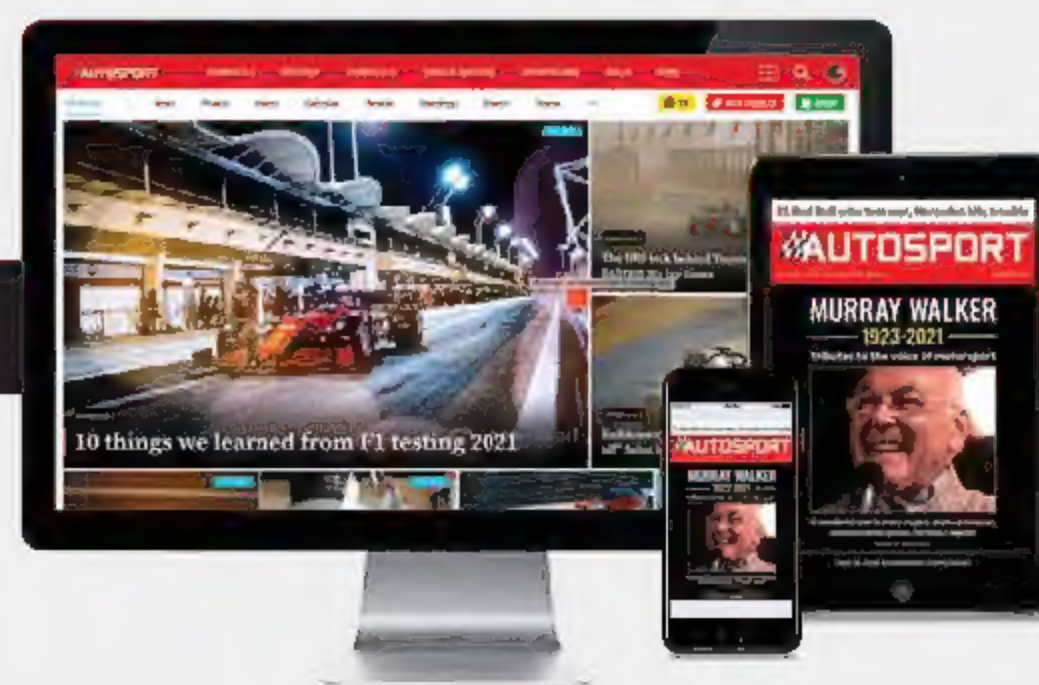
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Murray Walker

— 1923-2021 —

ADAM COOPER

PHOTOGRAPHY  **motorsport**
IMAGES

Broadcasting legend Murray Walker, who has died at the age of 97, made a huge contribution to growth in interest in Formula 1 in Britain. Generations of fans grew up listening to his voice describing the exploits of drivers such as Jackie Stewart, James Hunt, Nigel Mansell, Damon Hill and Jenson Button. To the wider public he was best known for his occasional gaffes and the “trousers on fire” commentary style so famously described by Clive James.

At heart he was a hardworking and hugely knowledgeable enthusiast, who was admired and respected by the drivers and team bosses, and by everyone who knew him in paddocks across different disciplines. His fame extended well beyond the UK, since his commentaries went also to Australia, New Zealand, Canada and South Africa. More people listened to him in the Netherlands and Belgium than followed their local broadcasters.

He came into broadcasting in the slipstream of his father. The name Graham Walker figured large in his life, and Murray made no secret of the fact that he always tried to live up to his dad’s legacy. “I was born into a motorsport family,” he explained. “My father was a professional racing motorcyclist from round about 1920 to 1935. I used to go on the continent with him and my mother, attending races.

“It struck me as being quite normal, because it’s what my father did. But while I was going to Germany, Holland, Belgium and Italy it was quite unusual for people in England to have been to Scotland, or Wales, or Clacton – never mind a foreign country!

“He won the TT and was the equivalent of world champion before the war. By a combination of natural ability, bloody hard work and application, he got the job done. He had a gigantic personality. He was a wonderful man; he was a decent, honest, likeable person. He was very good with words, and a brilliant after-dinner speaker.”

On retiring from the saddle, it was only natural that Walker Sr should turn to broadcasting, and he became the BBC’s voice of motorcycling. In those days, the TT was a major national event. “They used to have a team of five commentators around the course,” Murray recalled. “But the main point was back at the grandstand. He masterminded all that, and he did it brilliantly. I’ve got recordings of

him, which I listen to with admiration and gigantic respect.”

As soon as he was old enough, Murray was in the thick of the action. It’s hard to imagine the Walker of his commentary days issuing orders with his head sticking out of a tank turret, but his war service was serious stuff. “I went through Sandhurst, and I became God’s gift to the British army, because I now had a Second Lieutenant’s pip on my shoulder!

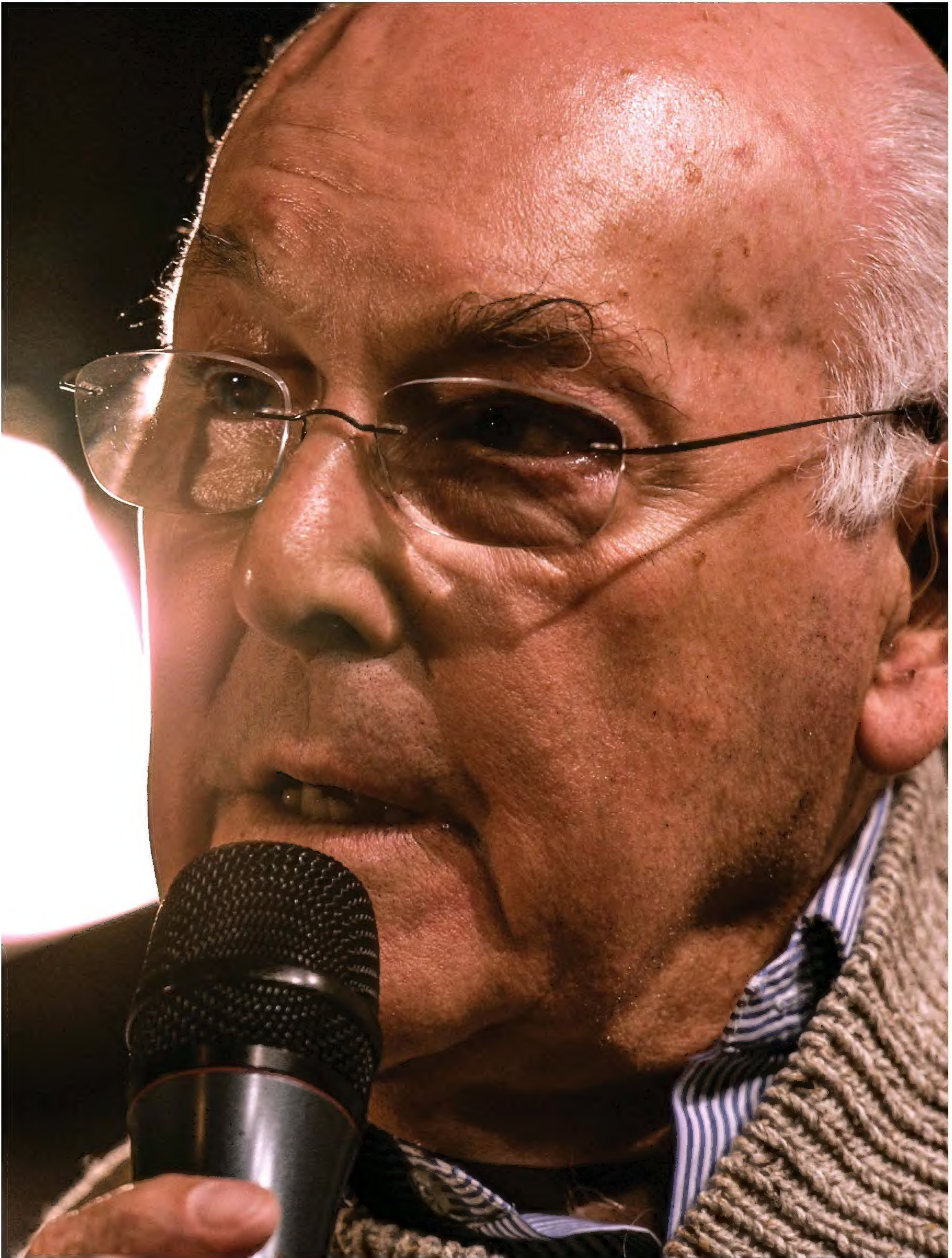
“The Royal Scot’s Greys was very much a cavalry regiment. To be honest I was a round peg in a square hole because I’m not a horsey person, but they weren’t mechanical people, and it suited them very well that I was. I joined them in Normandy from Sandhurst. I fought through Holland and Germany, did the Rhine Crossing, and my regiment did the link-up with the Russians.

“Then I was promoted and became technical adjutant of the British Army of the Rhine Armoured Fighting Vehicle School at Belsen, the concentration camp that had been turned into an army establishment. I’d gone into the army as a boy, and I came out a man. It’s a bit of a cliché, but it’s true.”

It was perhaps inevitable that the demobbed Captain Walker should try to emulate his dad’s two-wheeled achievements. “To be honest at first I wasn’t particularly interested in the sport,” he admitted. “It was just something that was part of my life. My real interest didn’t begin until after the war. I did get the bug then, and started racing motorcycles, but I wasn’t very good. I won a race, had a few places, but I was better at trials riding. It slowly became clear to me that the flame wasn’t burning brightly enough. I suppose I realised I would do better at business, and riding became a hobby.”

Business meant spells in advertising for Dunlop and Aspro before “I got headhunted to change direction in the advertising business from being a client to being on the agency side. That was really my forte – I had at last found something that suited me. By then I’d also started broadcasting.”

The family connection kickstarted Murray’s part-time BBC career in 1949, initially with cars rather than bikes. His first radio outing was at the British Grand Prix at Silverstone, alongside Max Robertson, and the same year he made his TV debut at a >>



hillclimb event in Kent. He also joined his dad to form a unique pairing for bikes. "I carried on broadcasting motorcycles with my father from 1949, when I started, to 1962, when he died. We were more like brothers than father and son. We had a great rapport and had a telepathic thing going.

"There was never any need to do this 'Over to you Murray' stuff, because I knew when he was going to stop, and vice versa. I was also doing what I call the crumbs from the rich man's table in motor racing, which was the things Raymond Baxter didn't want to do or wasn't able to do."

Baxter was the anchorman of the BBC's motor racing coverage, and Murray waited patiently in his shadow for two decades. "He did the big ones and I did the little ones," recalled Walker. "I did the F3, rallycross when it started, but also the odd GP. I was doing quite a lot for radio on cars, and I also worked for years for ITV, doing motorcycle scrambles, while working for the BBC. On two occasions I had commentaries going out on both channels simultaneously on a Saturday afternoon!"

Walker wasn't frustrated that Baxter got priority: "You've got to remember that from Monday to Friday, I used to get in the office at 8am, and work a very long day. Every year I was with the agency was a record year. And that was my life. The broadcasting was my hobby. So it wasn't very frustrating, because I was doing a lot of travelling for the company, and I was very heavily occupied."

Walker was a huge success in advertising, where he looked after clients such as British Rail, the Co-op, Beechams, Vauxhall, Kit-e-Kat and, most famously, Mars Confectionery. As account director, he got the slogans into the memories of millions.

Baxter wasn't getting much F1 work either. The BBC had never shown more than a handful of GPs each year, and in the mid-1970s the category all but disappeared from British screens. It was largely a delayed reaction to the proliferation of cigarette sponsorship, while the arrival of Durex contraceptive backing at Team Surtees in 1976 didn't help. BBC coverage of James Hunt's championship-winning 1976 season was restricted to the finale in Japan, and even that was shown first by ITV. Then, in 1978, there was a massive turnaround.

ITV threw its hat into the ring by showing three races live, and the BBC responded by experimenting with highlights on Sunday evenings. Thus *Grand Prix* was born, and Walker, not Baxter, got the job. The latter's star had waned since a Monaco GP four years earlier, when he was commentating in the London studio and Murray was at the circuit to send information back. The line failed, the crash-strewn race was chaotic, and an ill-informed Baxter floundered helplessly.

Despite that disaster, the studio trickery continued. Murray would do his research during practice, travel back to London on



Hunt and Walker were a brilliant double act – and firm friends



Walker donned uniform for Goodwood, but had also served with distinction

"I'm a one-track mind. My wife says if it hasn't got an engine, I'm not interested"

Saturday, watch the race arrive via satellite at the BBC, wait as the highlights package was cut together, and then add his commentary as it was broadcast that night, knowing exactly what was going to happen next.

Even after *Grand Prix* gave him regular work, Murray continued with his day job: "I had an absolutely enthralling business life. I helped to build a company that when I joined in 1959 had one office in London, and by 1982 was a 54-office business, in 26 countries, with about a \$1.5 billion turnover. I didn't do all of that, but I did a lot of it. And it was pretty stressful. I reached a point when I was 59 and a half when I thought, 'Bugger this, I've got to stop something'. So I stopped the job a bit early. They gave me my full pension, bless 'em, and I thought I'd have a few broadcasts to occupy me."

Grand Prix's audience grew, especially after James Hunt came on board to provide unexpurgated expert opinion. Walker was wary of Hunt at first, but they became firm friends. Together, they began to cover most of the races in situ, a practice that increased after *Sunday Grandstand* created a new live slot on BBC2 in the mid-1980s. Budget constraints meant that as late as 1993 Murray didn't get to some events outside Europe, although he tried to maintain the illusion.

Live broadcasts added to the pressure and increased the possibility that something might go wrong. Part of Walker's enduring appeal was the prospect that he might trip over his tongue, or congratulate someone on their winning drive just before they slid into a barrier. Millions of armchair fans liked to catch him out, but he claimed that it didn't bother him.

"No, it doesn't actually, although I don't wish to sound complacent," he said. "First of all I'm a human being, and all human beings make mistakes. But my consolation is that



SUTTON

Hill's championship win became an iconic moment in sports commentary



what people say are mistakes are, in my eyes, a slip of the tongue or a failure to observe something because I wasn't watching the screen, because I had to do something else.

"Which explains it – it may not excuse it, but it explains it. If people were getting at me for cocking it up because I didn't know enough about it, hadn't done my homework, hadn't applied myself to it, then I would be extremely worried. But happily for me, it seems to have become a loveable trademark and that gets me off the hook to a certain extent."

Murray had the last laugh. He took full advantage of the jibes and ritual humiliation on BBC *Sports Personality of The Year* to become a well-paid after-dinner speaker, and a much-wanted name in the TV advertising world he knew so well.

Many viewers didn't know how difficult his job was, especially after pitstops became standard and made races infinitely more complex. "I think it's more frustrating with my sport than most others," he explained. "Football, for example, is a fairly simple sport. You can see there are 11 blokes on each side, and what they're trying to do is kick the ball between these two posts. But even I don't know the half about what goes on inside a GP team, and I've been observing it and trying to find out about it for years."

"So I am talking from the point of view of somebody who doesn't know it all, to somebody who knows infinitely less than I do, who probably isn't particularly interested in the sport, and who has just had his lunch, taken his dog for a walk, and turned the TV on. I'm talking about most of the viewers, not the anoraks. And somehow we have got to tell them what it's all about."

And then there was the constant knowledge that drivers could get hurt. When Gerhard Berger sat helpless in the remains of his burning Ferrari at Imola in 1989, Walker said simply and with dignity that nothing he could say could add to what the viewer was seeing for himself. "I thought Berger was dead and his body was being cremated and we were live on television," he admitted. "But you can't say, 'My God he's been killed and he's being burned to a cinder'. But nor can you say, 'Oh he's all right. Don't worry, they'll soon put it out and he'll be right as rain tomorrow'. Because you don't know that either."

"This is the difficult bit. You are live, talking to millions of people worldwide. In these stressful situations it is a big problem to get it right, not be too extreme one way or the other. It becomes instinct, or feel for what you should say or what you shouldn't say, rather than consciously thinking about it."

Thankfully Berger was not seriously hurt. Five years later Ayrton Senna crashed at the same corner. His Williams looked

barely damaged as the TV helicopter lingered above it but, as the seconds ticked away, it became apparent that something was seriously amiss. Murray had to keep talking, at least until the BBC director cut back to the studio: "The blackest day while I've been commentating and someone has been killed. There's never been a situation where such a gigantic and charismatic personality has been involved, and where it was literally happening in front of millions of people, to whom you were having to convey the facts responsibly, without going over the top too much emotionally. It was an extremely difficult experience."

In contrast, two years later Walker experienced one of the highs of his career, famously saying that he had to stop due to a lump in his throat as Damon Hill crossed the line at Suzuka to clinch the 1996 world championship. He also received an OBE for services to broadcasting that year.

A few months earlier, the news that the BBC had lost its F1 deal to ITV for 1997 came as a huge shock. "I had been doing an after-lunch speech," he recalled. "I got into the car to drive the 20 miles home, turned on the radio and the top item was, 'The BBC has lost the GP rights to ITV'. It was a complete bolt from the blue. Nobody knew about it. Even Jonathan Martin, the head of sport, didn't know about it. So yes, it was a bit of a choker, to put it mildly."

"But then on reflection, I said to myself, 'Well, I've been doing it a bloody long time, I'm at the end of my career rather than the beginning. If it stops here that's my hard luck, but I couldn't have gone on very much longer anyway, so maybe this isn't a bad time to stop.'"

It was far from the end of his career. ITV wanted Walker's services, and he duly signed up. He would continue as lead commentator for five seasons, forming a brilliant new team with Martin Brundle, before finally calling time at the end of 2001.

Even then he didn't stop, continuing to contribute on ITV, BBC Radio 5 Live, Sky and Channel 4, and writing a hugely successful autobiography. Health issues slowed him down in his nineties, but he always kept himself up to speed with the latest F1 gossip.

He didn't have time to pursue any other hobbies – he didn't have any: "I'm a one-track mind. My wife says if it hasn't got an engine, I'm not interested. I'm incapable of remembering the minor things of life, like going to the shops and getting something, if it hasn't got an engine noise attached to it! But I'm working at my hobby. Most people, when they finish their working life, look forward to developing their stamp collection or whatever. Well, I'm doing that."

Which perhaps helps explain why Murray Walker will be fondly remembered by many millions of fans. ❧



"And Hill finishes second! Again!"
Double act with Damon made
for hilarious Pizza Hut advert

Tributes

PHOTOGRAPHY motorsport
IMAGES

Lewis Hamilton

So sad to hear of Murray's passing. I remember growing up hearing your voice over the races. You made the sport so much more exciting and captivating. The iconic voice of our sport and a great man, thank you for all you did, you will never be forgotten. Rest in peace

Jackie Stewart to Associated Press

He is one of those people that will be remembered forever and not too many commentators could expect that to happen after their life. He was a gentleman of the sport, his command of the English language was huge, so

too his excitement and his energy.

It is a great loss. I spoke to him not that long ago. He was in a care home and we had a good conversation. I don't think many people knew he was not living at his home so I don't think he had had too many calls. I was thrilled to get in contact with him.

We are all at a certain age where we are seeing friends and colleagues slip away which is very sad, but in the case of Murray, he will never be forgotten.

Nigel Mansell

Sad loss of dear Murray a special friend to our family. Many fantastic memories

that we will cherish forever.

Deepest sympathies to Elizabeth

Martin Brundle

Rest in Peace Murray Walker. Wonderful man in every respect. National treasure, communication genius, Formula 1 legend.

Damon Hill to the Daily Mail

As for his comment about having a lump in his throat, it has become the tagline, the key phrase in my whole story. It took someone of his stature as a commentator to do that. I think he was genuinely emotional and happy for me and willing to convey that. I am eternally grateful to him to come out with one of those classic moments.

He had a voice that was made for the microphone and for motor racing. A two-stroke engine voice from years hanging about motorcycling! He could up the revs and cut through all the fluff.

Jonathan Palmer

The concentration required to not just follow everything that is going, but to continually and pertinently comment on it, is enormous. And on top of that is the true talent of commenting eloquently too, which Murray not only naturally excelled at, but he had the



Walker brought Mansell
and 'Red 5' to the top of
British sporting agenda



added gift of such a distinctive, easy to listen to voice and delivery.

The skill that I admired most of all though was his ability to not just read, but amplify the right mood. His excitement and unadulterated delight at great success, particularly such as Nigel Mansell or Damon Hill winning a grand prix, let alone a world championship, was legendary, and stirred the soul.

Williams F1 team

We are truly saddened to hear of Murray Walker's passing. Murray was the voice of F1 for so many, and provided unforgettable commentary on many of this team's most iconic moments. His passion for the sport was infectious, and never failed to make people smile.

McLaren F1 team

Like millions of F1 fans, all of us at McLaren are deeply saddened by the news that Murray Walker has passed away. He brought our sport to generations by sharing his passion and knowledge with humour and humility. Our thoughts are with all who had the fortune to know him.

Karun Chandhok

Like millions of fans, Murray Walker was a huge part of my childhood.

Growing up in India, I used to watch the races on VHS tapes months after the race & his iconic way of commentating got me excited about F1. RIP Murray – you made the world a better place.

Ben Edwards

So sad to hear the news about Murray. He was inspirational, supportive and a legend. I feel honoured to have worked in a neighbouring booth to him and then with him directly when I joined the BBC and he came along to Silverstone. His voice will stay with me forever.

David Croft

Rest in Peace Murray Walker, a gentleman and a legend in every sense of the word. It was an honour to know you, a delight to spend time in your company and inspiring to listen and learn from you. THE voice of Formula 1 and always will be. Thankyou xx

British Touring Car Championship

Such sad news to hear that Murray Walker OBE has passed away. Murray was a true inspiration to us all, an icon and true motorsport legend. We are eternally proud that his infectious commentary was such a big part of the BTCC. Thank you... Rest in Peace Murray.

John Cleland

Murray meant everything to motorsport fans the world over what a lovely man who will be sadly missed RIP Murray we will always remember you my friend.

Jason Plato

Just terrible news, I and many millions will deeply miss you, but we will all never forget your wonderful love of our sport. Sleep well my friend.

Matt Neal

Anything else happening has been blown into insignificance by the news Murray Walker absolute legend & one of the most humble charming guys I've had the pleasure to be with has passed away. #RIPMurray some Senna, Hunt, Lauda Comms in clouds ahead.

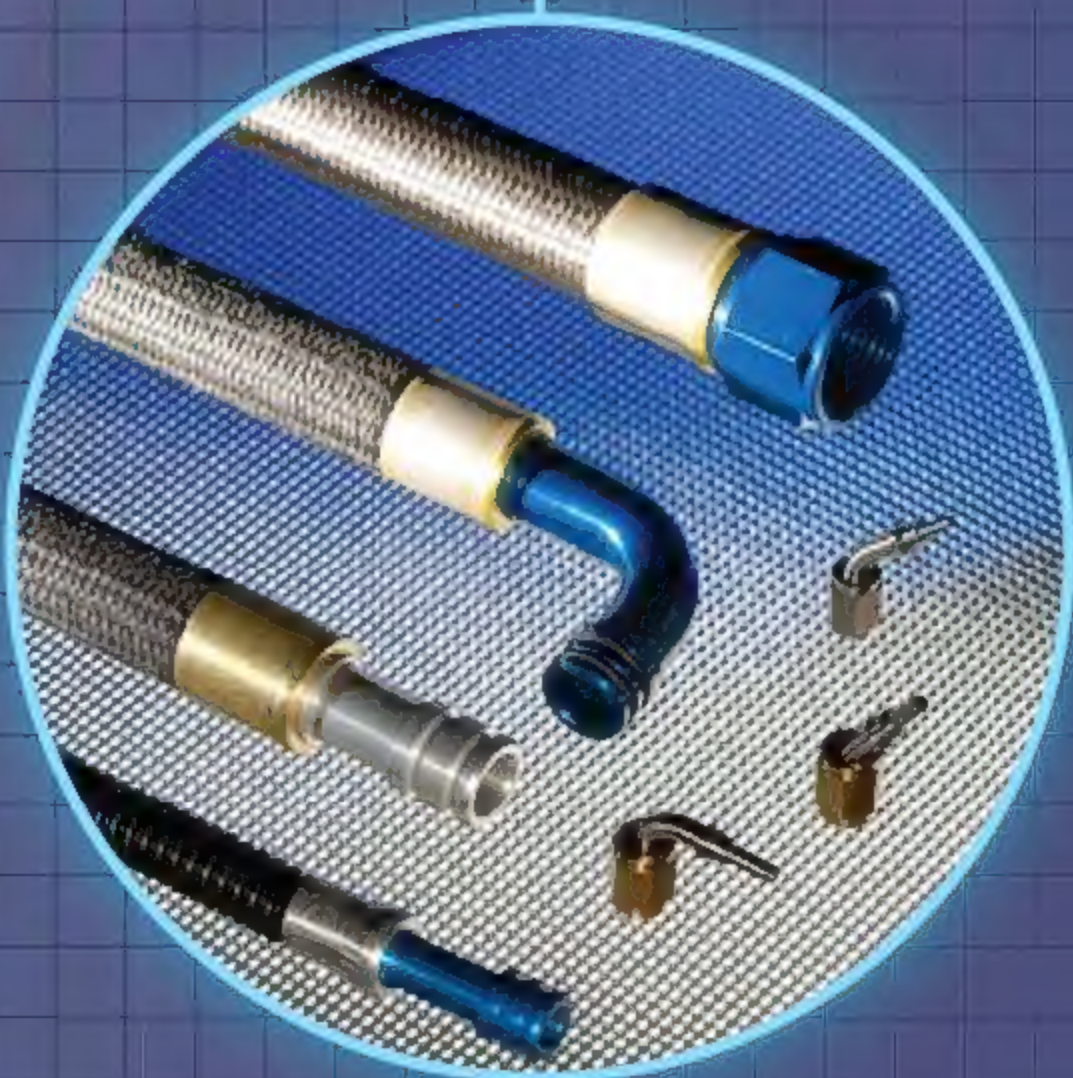
Rickard Rydell

Very sad to hear Murray Walker has passed away. He was a great man and a great ambassador for the sport we love. Privileged to have got to know him during the BTCC years.

Ash Sutton

This is heart wrenching. The voice of motorsport and that can't ever be replaced! Rest in peace Murray x

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Memories of Murray, who brought joy to millions

The Motorsport Network president was on the UK's F1 commentary team with the great Murray Walker, and remembers a man who had a gift for communication

JAMES ALLEN

Murray Walker's was a life extremely well lived. He brought joy to tens of millions from Southend to Sydney and popularised the sport of motor racing for many generations. But what made Murray Walker the person and the broadcasting legend that he was?

Fittingly for a man who was unique, it was an exceptional combination of factors. First, his heritage in the sport and passion for it. Like me, he was drawn in by a father who raced, in his case on motorbikes, and worked in the sport. Murray was devoted to his father, who also introduced him to commentary. He is known as the voice of F1, but Murray had a boundless enthusiasm for many racing categories and was equally at home providing the soundtrack to all of them. One of the most famous 'Walkerisms' came from a rallycross commentary where he was extolling the virtues of being in the lead so the driver could have a clear view and the car promptly crashed into an earth bank!

You have to be committed to travel the world and put yourself out there, race after race, year after year, and Murray was still properly into the buzz of F1 well into his late seventies, when the relentless travelling inevitably began to catch up with him.

"He treated everyone the same, whether you were Ayrton Senna or his gearbox man"

Next was his ability to know what the audience wanted. That came from his long advertising career, where he made millions of consumers believe that 'Trill makes budgies bounce with health', or that 'a Mars a day helps you work, rest and play' among other slogans he either invented himself or oversaw as the account manager. Broadcasters are, by definition, on 'transmit' all the time, but the best ones listen too. They know what messages and delivery styles cut through and resonate with the audience, and Murray's was as thorough and well curated an approach as you will find. His notes were meticulous; tiny, tidy writing on a pad he rested on top of a camera tripod case he placed directly between him and the TV monitor. This was the product of hours of walking the pitlane and paddock, chatting to people.

He understood exactly what the British public loved about Nigel Mansell and Damon Hill and layered that into his commentary. He understood the mystique of Ferrari and how to express its triumphs and its failures. He knew what made Juan Manuel Fangio and Jim Clark great because he'd seen them race, so he knew greatness when Michael Schumacher burst onto the scene. Schumacher had immense fondness for Murray, and appreciated how he handled the narrative of the German duelling with the plucky Brit.

He brought to his commentary huge energy and emotion; he not only stood up to commentate, but was on the balls of his feet the whole time. He's known for his 'gaffes' but they were an inevitable consequence of being always on the ragged edge, leaving no margin for error. Had he been a driver he'd have spun off frequently, like Mika Hakkinen at Monza that time, where Murray brilliantly channelled the drama and empathy of the moment and found the perfect words, as he so often did. He was always 'in the moment', and that is what you can hear in any of the clips you see on YouTube or Sky F1's Classic Race reruns.

We have heard since his sad passing at the age of 97 many stories of how he was so well respected that he could walk into any team garage or motorhome whenever he wanted, a privilege afforded to very few in F1. And this is true. But less well known is that he was just as much at home on the shop floor, with the mechanics and truckies, with whom he always spent time.

This came from his experiences in the Second World War when he was called up to serve in the Tank Regiment and became part of the force that swept through mainland Europe and brought the conflict to an end in 1945. Britain was very class ridden and hierarchical in those days, and Murray didn't care for people with aristocratic airs and graces. Life in the barracks threw everyone in together and made everyone the same, and Murray loved that. It also made him the man he was; he treated everyone the same, whether you were Ayrton Senna or his gearbox man.

Autosport could fill bound volumes with the stories about him and the anecdotes he told. We travelled the world together for five years, I drove him from airport to hotel to race track and heard his countless stories, shared many great moments on air, and was privileged to have had so much time with a man whose unique appeal you are seeing reflected now in the tributes to him. He loved being Murray Walker and all that came with it, and he would be pleased and proud with the send-off he is receiving. The tributes have been unanimously warm and affectionate.

A gentleman, a pioneer, an Everyman and an exceptional man. That was Murray Walker. ✽

Silverstone set for sprint race on British GP Saturday

FORMULA 1

Should the post-lockdown protocols allow a crowd to attend this year's British Grand Prix, it seems that you may have to be there on the Friday to get your traditional qualifying fix. That's because Silverstone looks poised to host Formula 1's inaugural 'sprint qualifying' race on the Saturday as teams prepare to give the proposal their final approval.

Following the latest F1 Commission meeting at the end of January, F1 has been working on plans for sprint races to debut in 2021 after the plan received "broad support" from teams. A working group was formed to flesh out details after a number of questions emerged from the meeting, with the target of having a final proposal in place for teams to vote on before the start of the new season.

It has now emerged that the races will be run under the name 'sprint qualifying', taking the Saturday afternoon slot traditionally occupied by qualifying, which will be shifted to Friday afternoon and run under its usual format.

After initially targeting the Canadian Grand Prix in June as the first event to feature sprint qualifying, F1 bosses are now understood to be planning for the British GP for the format's debut. It is also set to appear at Monza and Interlagos.

Teams met with F1 bosses Stefano Domenicali and Ross Brawn at last week's Bahrain test to discuss the plan further, and continued to give their support. A final vote is expected before the season opener

in Bahrain next week.

It is anticipated that points will be awarded 3-2-1 for the top three finishers in sprint qualifying, the result of which will form the grid for the grand prix on Sunday.

The plan was also discussed with drivers last Thursday in Bahrain after a number of them aired concerns, including Aston Martin's Sebastian Vettel, who said it "made no sense" and would risk devaluing the grand prix on a Sunday. But Brawn made clear this was not the intention, and that F1 would not hesitate to scrap sprint qualifying for future seasons if it was not a success.

"The critical thing is to preserve the grand prix," said Brawn. "We want the winner of a grand prix to come away from those weekends still being the strongest and most successful competitor of that weekend. We'll have a much fuller weekend, and that's what we want to explore. We want this opportunity to try it at three races this year. If it doesn't work, then we'll put our hands up and go away and think about it again. But I'm quite optimistic about it. If you take the view of the whole weekend, then it's got a lot going for it."

Red Bull chief Christian Horner praised F1 for being "reasonably responsible" with its plans to use sprint qualifying at only three races. "From a promoter's point of view, I understand why they're trying to do it," he said. "There's always a million reasons why not to do something. But I think the concept is interesting. So why don't we try it? Let's give it a go."

LUKE SMITH



GOI DAND GOOSE/MOTORS PORT IMAGES

Miller grinds to top on Ducati

MOTOGP

MotoGP's second and final pre-season test in Qatar came to a close last Friday with only five riders completing laps on the last day due to high winds and sandy track conditions.

This meant Jack Miller's fastest-ever Losail lap set on the opening day of the test went unchallenged. The Ducati rider (above) has been tagged by many as the 2021 title favourite, a fact "I enjoy a lot".

Miller, along with factory Yamaha duo Maverick Vinales and Fabio Quartararo — who finished the test 2-3 on combined times — displayed some of the best long-run pace of the field. Both Yamaha riders grew happier with the 2021 M1 chassis, while Petronas SRT's Franco Morbidelli was pleased with the "substantial" updates on his older 'A-spec' bike.

Alex Marquez fractured his foot in his fifth crash of the test on his LCR Honda, while Pol Espargaro was beaming after his debut Honda test, despite a small off.

World champion Joan Mir feels only "70%" ready for the season and is likely to start it on the 2020 Suzuki chassis.

LEWIS DUNCAN

TOP 10 LOSAIL TIMES

POS	RIDER(BIKE)	TIME
1	Jack Miller (Ducati)	1m53.183s
2	Maverick Vinales (Yamaha)	1m53.244s
3	Fabio Quartararo (Yamaha)	1m53.263s
4	Franco Morbidelli (Yamaha)	1m53.323s
5	Francesco Bagnaia (Ducati)	1m53.444s
6	Aleix Espargaro (Aprilia)	1m53.640s
7	Joan Mir (Suzuki)	1m53.827s
8	Alex Rins (Suzuki)	1m53.860s
9	Johann Zarco (Ducati)	1m53.899s
10	Pol Espargaro (Honda)	1m53.899s



Last F1 race held on a Saturday at Silverstone was 1983 British GP. Here Tambay leads Arnoux and winner Prost



WEC Alpine has unveiled the livery in which its World Endurance Championship challenger will race in 2021. The Alpine-Gibson A480, an ORECA design that formerly raced as the Rebellion R-13, will compete in the Hypercar class against new-rules machinery from Toyota and Glickenhaus. Nicolas Lapierre, Matthieu Vaxiviere and Andre Negrão will race the Signatech-run car, which will be slowed to bring its performance in line with the LMH cars. **Photograph by Alpine**

Alpine junior Lundgaard throws down gauntlet

FORMULA 2

Alpine Formula 1 junior Christian Lundgaard topped last week's official three-day Formula 2 pre-season test in Bahrain by an eye-opening 0.331 seconds, but as usual it was a case of pinpointing when teams sent their drivers on quick runs.

Drivers were restricted to just two sets of the soft option tyre for the test, and six sets of the new hard prime rubber, which likely title contender Robert Shwartzman labelled as "much more complicated" than the previous hard Pirelli. "We have less grip, and degradation is more difficult to control," said the Prema Racing-run Ferrari protege. "Anyway, we got really close to our limit and to putting everything together, and we know where to work."

The majority of teams chose the second and third mornings for their performance



runs, although Carlin went out on a limb on the second day, when Dan Ticktum set the fourth fastest time overall of the test, with only team-mate Jehan Daruvala within 1s.

The top three times overall came on the second morning, when ART Grand Prix racer Lundgaard (above) headed Bent Viscaal (Trident) and Marcus Armstrong (DAMS).

Ferrari-backed Armstrong was slightly slower on the third morning, but topped that session, with Hitech pair Liam Lawson and Juri Vips plus Virtuosi's Guanyu Zhou within 0.1s of the Kiwi. David Beckmann also looked strong at times with Charouz Racing System, and headed the opening day.

TOM HOWARD

TOP 10 BAHRAIN TIMES

POS	DRIVER (TEAM)	TIME
1	Christian Lundgaard (ART)	1m41.697s
2	Bent Viscaal (Trident)	1m42.028s
3	Marcus Armstrong (DAMS)	1m42.038s
4	Dan Ticktum (Carlin)	1m42.185s
5	Liam Lawson (Hitech)	1m42.218s
6	Juri Vips (Hitech)	1m42.224s
7	Guanyu Zhou (Virtuosi)	1m42.246s
8	Robert Shwartzman (Prema)	1m42.257s
9	Theo Pourchaire (ART)	1m42.347s
10	Lirim Zendeli (MP)	1m42.356s



BTCC Team Hard has shown off the Cupra Leon, which has replaced its venerable Volkswagen CCs. Four will be run in 2021, for Jack Goff, Aron Taylor-Smith, Glynn Geddie, and an unnamed fourth driver expected to be Nicolas Hamilton. Team manager Jamie Warren said: "A big credit has to go to our two leading engineers, Adam Tanner and Phil Overall, who have been instrumental in developing the aero and overall balance." **Photograph by Kwik Fit/Alex Wood**

BMW tweaks colours as Ingram tests Hyundai

BTCC

British Touring Car Championship teams have been hitting the track in the past week or so to begin their pre-2021 test programmes, and BMW squad West Surrey Racing has unveiled the livery its trio of 330i M Sports will carry.

WSR's four-time champion Colin Turkington took to Silverstone last week in an all-black hue (presumably exciting Kiwi team boss Dick Bennetts), before the revealing of the scheme that Turkington, Tom Oliphant and Stephen Jelley will race in. As can be seen, it's a variation of the 2020 black-and-stripes, but to Autosport's eyes the standout change is that Turkington is carrying an unaccustomed #2...

The new Motorbase/MB Motorsport alliance was out at Snetterton, where Ollie Jackson, Sam Osborne and Andy Neate continued work on the Ford Focus. Also on track in Norfolk was Tom Ingram, who had his first taste of Excelr8 Motorsport's Hyundai i30 N after seven seasons with the Toyota-equipped Speedworks Motorsport.

"It was nice that the ideas 'Spenny'

[engineer Spencer Aldridge, who has made the trip from Speedworks with Ingram] and I came up with have worked straight out of the box," said Ingram. "It felt brilliant right from the start, which is encouraging. Pace-wise, in the dry we did a new-tyre run, almost a qualifying simulation, and it was good enough for the front row last year."

• The BTCC has changed the dates of two rounds in a bid to maximise the chances for spectators to attend. While the opening round will take place behind closed doors at Thruxton on 9 May, the next two events at Snetterton and Brands Hatch have moved back to 13 June and 27 June respectively.

MARCUS SIMMONS



Virtual points for real series

GT WORLD CHALLENGE EUROPE

The real and virtual worlds will come together in the GT World Challenge Europe this season, with points in the real-world teams' championship up for grabs in a new Esports competition to run on the GTWCE Endurance Cup bill.

Teams competing in the Pro and Silver Cup classes of the Endurance Cup will be required to enter each of the one-hour GTWCE Esports Cup events held the day before the five rounds. Points will be awarded on a 3-2-1 basis for the top finishers in each of the two classes in the teams' classification in both the Endurance Cup and the overall GTWCE.

Those teams with multiple entries across one of the classes will be required to nominate one driver to participate in the virtual race. Teams contesting both divisions will be required to put forward one driver from each.

"We need to be 21st century," said series boss Stephane Ratel. "We have the perfect series to do it with, because we have the Endurance Cup, the Sprint Cup, and now the Esports Cup, and the combination of the three will now determine the overall teams' champion. I believe each team will have at least one driver who is



good at gaming. This will create excitement in the paddock and help bring our series to so many more people."

Ratel explained that it wasn't workable to extend the initiative, dubbed the Fanatec Points Boost after the new GTWCE title sponsor, to the drivers' championship because it is only possible to bring 24 gaming stations to the tracks. But he outlined a hope that the role of virtual racing in the GTWCE could grow in subsequent years. "I believe that in the

future we can have drivers in simulators competing in the real race, but for that we need a little more time," he said.

The idea of incorporating an Esports competition within the GTWCE started with the Stephane Ratel Organisation's launch last year of a series based on the Assetto Corsa Competizione platform. The SRO E-Sport Cup resulted from the delayed start to the GTWCE season and ran over five rounds, finishing in June.

GARY WATKINS



Ex-BTCC hero Radisich to race again

TCR NEW ZEALAND

Two-time Touring Car World Cup winner and 1990s BTCC hero Paul Radisich is to make a shock tin-tops comeback – in TCR New Zealand.

The 58-year-old Radisich is one of the star names tempted out for the inaugural TCR NZ contest, which has been reduced to one weekend at Highlands Motorsport Park on 23-24 April. That's because the country's strict coronavirus-combatting

restrictions have led to logistical problems importing TCR cars for many of the local competitors.

"It's been two decades since I drove a two-litre touring car in anger," said Radisich, who will drive an M-Developments Volkswagen Golf GTI. "TCR is a great class and I want to see it happen. It's world class, so any young driver leaving New Zealand has some great opportunities overseas."

Radisich, who from the BTCC went on to compete in Australia,

will face competition from his former V8 Supercars rival Greg Murphy. The four-time Bathurst 1000 winner will line up alongside ex-Formula Master champion Chris van der Drift in Track Tec Racing's Audi RS3 LMSs, weeks after they both contested the New Zealand GP Toyota Racing Series event.

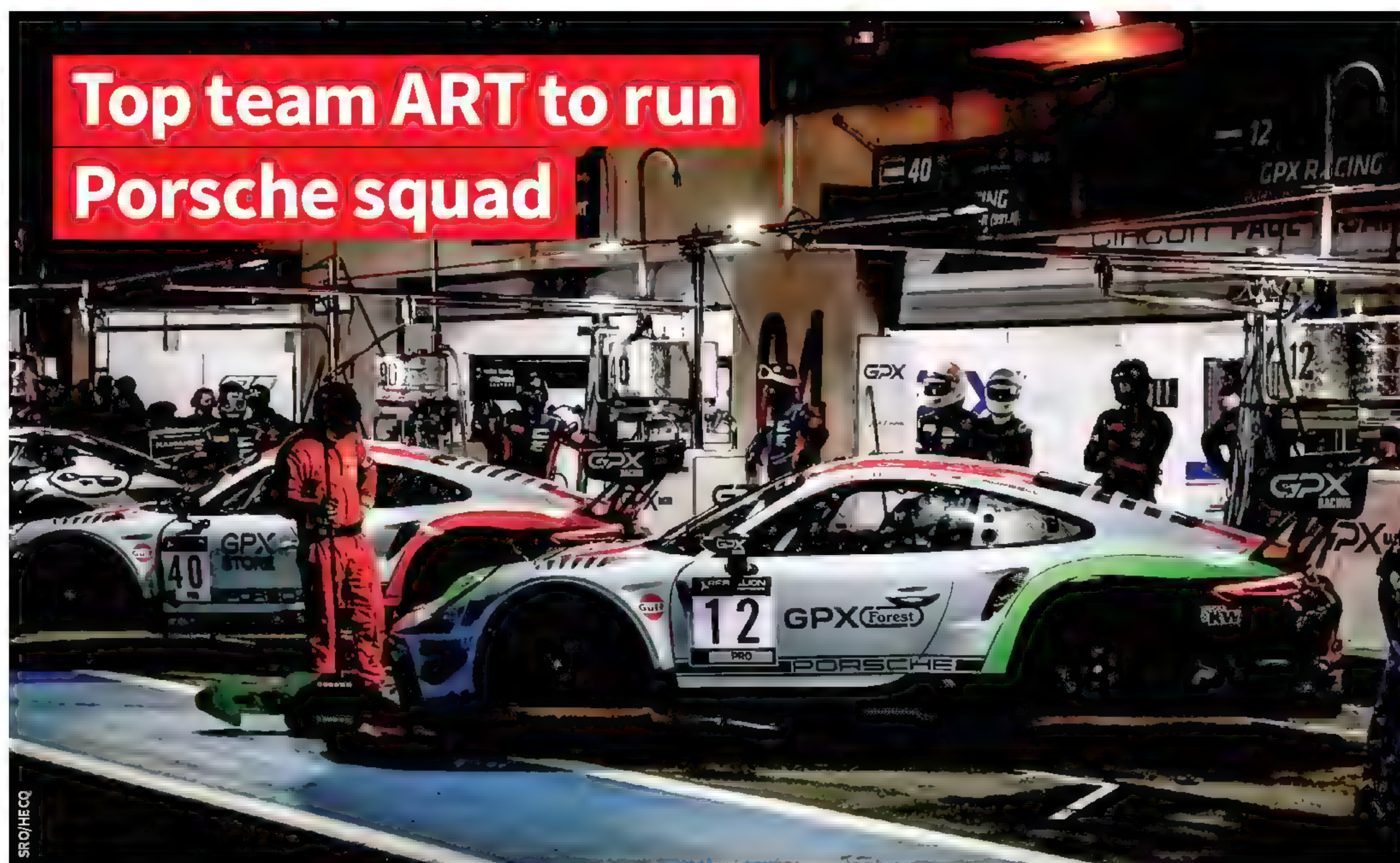
Also on the grid will be NZ's World Rally Championship ace Hayden Paddon, whose own team will prepare the Hyundai i30 N he is set to race.

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GT WORLD CHALLENGE EUROPE

French team ART Grand Prix is heading back to sportscar racing with Spa 24 Hours-winning entrant GPX Racing in this year's GT World Challenge Europe Endurance Cup.

ART, which has carried six drivers to GP2/Formula 2 titles, will field a solo Porsche 911 GT3-R for the Dubai-based entrant in the five-round series, which incorporates the Spa enduro won by GPX in 2019. The works-supported car will be driven in 2021 by two-time Le Mans 24 Hours winner Earl Bamber and full-factory drivers Matt Campbell and Mathieu Jaminet.

It will be ART's first sportscar involvement since it masterminded SMP Racing's World Endurance Championship LMP1 campaign with the AER-engined BR Engineering BR1 in 2018-19, which included a third position at the 2019 Le Mans 24 Hours.

ART is taking over the running of the Porsche from Barcelona-based Monlau Competición, which worked with GPX from 2016 up to last month's Asian Le Mans Series campaign. "This decision follows on from our strategy and the opportunities created by the current changes in motorsport and in endurance," said GPX team principal Pierre-Brice Mena. "We've got new avenues

to explore, so we had to resort to the services of a squad more familiar with the highest levels of motorsport."

ART, which was founded by Alfa Romeo Formula 1 team principal Frederic Vasseur as ASM in 1991, expanded into sportscars in 2014 in the Blancpain Endurance Series, the forerunner of the GTWCE Endurance Cup. This side of the ART organisation then switched to the DTM with Mercedes for 2015-16, prior to linking up with SMP for the WEC. ART returned to the DTM with BMW in 2020, fielding a car for Robert Kubica, backed by Alfa title sponsor Orlen.

GARY WATKINS

EFO gets plum F1 support as Foster joins grid

EUROFORMULA OPEN

The Euroformula Open series has secured a first in its history: a support date to Formula 1, on the bill for the Portuguese Grand Prix on the 23-25 April.

The slot gives EFO, which runs to the old philosophy of Formula 3 with the Dallara 320 chassis, its own bragging rights against the rival Formula Regional European by Alpine, which has two F1 support dates.

"It's a great job by Jesus [Pareja, series boss] and EFO to

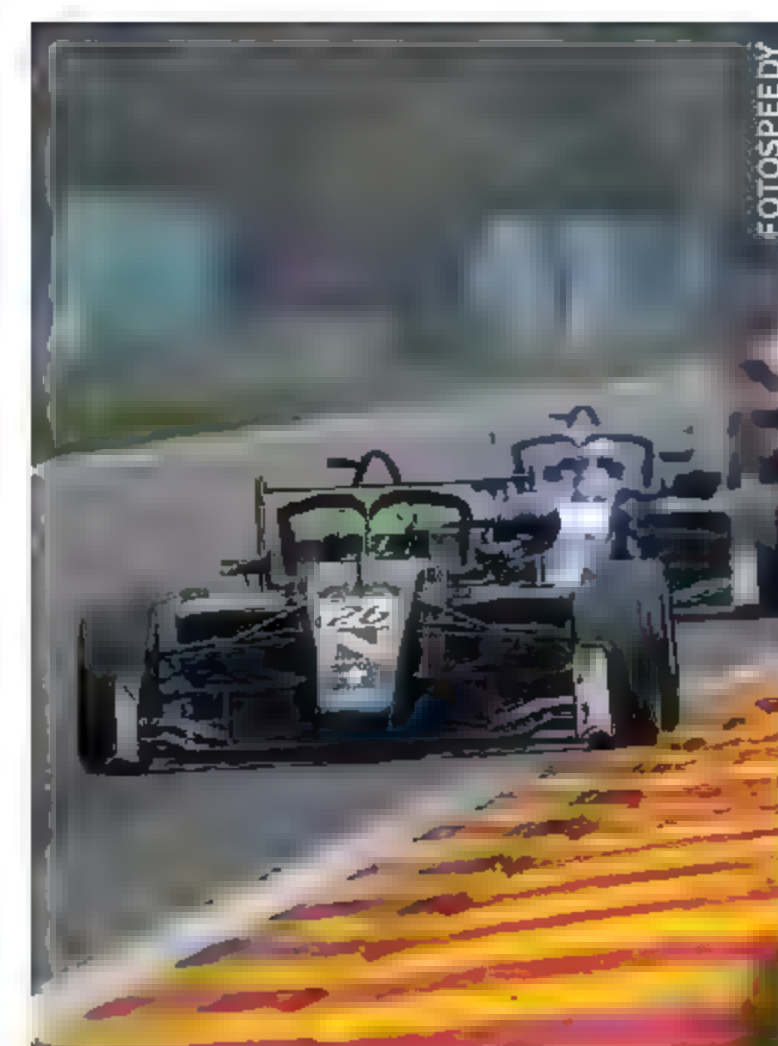
get us on there," said Double R Racing chief Anthony 'Boyo' Hieatt. "And it's great to show the world what the 320 is all about. People talk about Yuki Tsunoda, and he chose a good route to do EFO [alongside FIA F3] — a great chassis, loads of mileage, an ideal path into F2."

Double R has confirmed Venezuelan-Czech Zdenek Chovanec, a graduate of Italian F4, for its 2021 team. But Louis Foster, who won on his EFO debut with Double R in a late-season cameo at Spa last

season (right), has headed to the 2020 title-winning, Motopark-affiliated CryptoTower team.

"His performance in Spa 2020 has obviously caught our attention big time," said Motopark boss Timo Rumpfkeil. "We were able to perform a series of very productive tests in winter last year with Louis. I am sure that he will be a very strong contender and we are looking forward to equal our 2020 successes with Louis at the wheel."

MARCUS SIMMONS





Greene (left) team-managed Brabham, and (inset) drove family Gilby in Formula 1

PHILIPPS/MOTORSORTIMAGES

Keith Greene 1938-2021

OBITUARY

Keith Greene, who has died aged 83, contested a handful of grands prix as a driver, but it was as a team manager that he made his biggest impact over a 45-year career in the sport.

Touring car and sportscar racing became Greene's niche. He oversaw British Touring Car Championship titles with Alan Mann Racing in the 1960s, Gordon Spice Racing in the 1970s and 1980s, and Vic Lee Motorsport in the 1990s. And in sportscar racing he worked with manufacturers such as Nissan (twice) and Toyota, and privateers of the likes of Jean Rondeau, Alain de Cadenet and Richard Lloyd.

Greene joined Gordon Spice's operation in 1977, the second of the five straight seasons in which his team boss claimed the top class in the BTCC, then known as the British Saloon Car Championship. Spice also took him to Le Mans. When he was signed up by Rondeau for 1980, Spice insisted that 'KG', as he always called him,

ran the Group 6 coupe in which he ended up finishing third. Rondeau was so impressed that he put Greene in charge of the whole team for the following year.

"He was a very important part of our team, was old KG," said Spice. "I can't speak highly enough of him: he was a terrific bloke and a terrific team manager, though a difficult man to employ. He didn't want to fit into a system, but I put up with him because the things he was good at he was bloody good at."

Greene grew up around motor racing: his father Syd ran a team as an offshoot of his Gilby Engineering business. He began racing aged 17 at the wheel of a Cooper-Climax T39 'Manxtail', and made the first of his three world championship Formula 1 starts at Silverstone in 1960 in a Cooper-Maserati T45. Gilby subsequently built its own Climax-engined F1 car, in which Greene finished third in the non-championship Naples GP in 1962 behind the Ferraris of Willy Mairesse and Lorenzo Bandini.

GARY WATKINS

IN THE HEADLINES

MORE WEC FOR CORVETTE?

Chevrolet has hinted at an increased involvement in the World Endurance Championship after confirming that it will field a Corvette C8.R for Oliver Gavin and Antonio Garcia in the Spa series opener at Spa in May. It stated that "future racing opportunities [are] under consideration for the Corvette C8.R", and that it intends for the car to continue racing "in future years at Le Mans and select WEC rounds".

HABSBURG ADDS ELMS

Austrian Ferdinand Habsburg will dovetail his World Endurance Championship campaign for WRT with a second LMP2 programme driving for Algarve Pro Racing in the European Le Mans Series. The former DTM driver will share the Anglo-Portuguese team's ORECA-Gibson 07 with 2015 Le Mans 24 Hours P2 class winner Richard Bradley and ex-GP3 driver Diego Menchaca.

TECHEETAH OUT OF XE

Formula E powerhouse Techeetah has withdrawn from the inaugural Extreme E season, leaving the field at nine cars. The team cited the COVID-19 pandemic and travel restrictions. Meanwhile, Jenson Button's JBXE squad has announced that TCR Scandinavia race winner Mikaela Ahlin-Kottulinsky will drive alongside the 2009 world champion.

GOLD MEDALLIST STEPS UP

Andrea Rosso, the young Italian who won the Formula 4 Gold Medal at the inaugural Motorsport Games in 2019, will compete in the Formula Regional European by Alpine series this year with the FA Racing team named after Fernando Alonso. Rosso scored three race wins in Italian F4 in 2020, his first full season in cars. He will be joined at the team by Alexandre Bardinon, who competed in Euroformula Open last term. Finn Elias Seppanen, third in German F4 last year, is another highly rated talent stepping up, and he will race with Finnish team KIC Motorsport.

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We need to talk about Lorenzo

The multiple world champion's use of social media to air his gripes and grudges risks tarnishing his legacy. He needs to find another focus in his retirement

LEWIS DUNCAN

If you had earned millions of euros, could go anywhere, do anything you wanted and surround yourself with anyone you wanted, what would you do? If you're Jorge Lorenzo, apparently you'd spend your time glued to social media, reminding all your haters just how brilliant you are and getting into spats with other MotoGP riders.

The latest ugly episode took place during Qatar pre-season testing, sparked by a picture of Cal Crutchlow picking bits of gravel out of his crash helmet after sliding off his Yamaha at Turn 2. Since the Losail International Circuit came onto the MotoGP calendar in 2004, you'd be hard-pressed to find any rider who hasn't been caught out by the Turn 2 left-hander. You've just blasted along a one-kilometre straight, which you enter by turning right and end doing the same thing. In that time the left-hand side of the front tyre has cooled off considerably.

But to Lorenzo, this was seemingly proof of a rhetoric he's been spouting since last November, when Yamaha elected to dump him as test rider for Crutchlow. At the time, he said this decision was like "exchanging gold for lead". Crutchlow brushed off the comment in his usual manner, noting that Lorenzo's talent — which, make no mistake, is considerable — didn't necessarily mean he was a good test rider. And, given Lorenzo's final test on the Yamaha last October ended with him four seconds off an Aprilia

"There's no doubt Lorenzo had more to give. His talent wasn't spent — it was just his desire"

(albeit not having ridden since February and having scaled back his training), Crutchlow's words weren't exactly wide of the mark.

But the sight of Crutchlow crashing in Qatar was enough to prompt Lorenzo to comment on social media with a snarky "I told you". Crutchlow's best mate Jack Miller chimed in, telling Lorenzo to stop behaving like a child, to which the triple MotoGP world champion replied by (somewhat ironically) telling him to get off his phone and "start winning races".

Aprilia's Aleix Espargaro commented on the whole thing, noting "I prefer to be a good human than a champion". Which is when Lorenzo stooped to a low entirely unbecoming of a multiple world title winner. In response to this admittedly stinging swipe from Espargaro, Lorenzo said: "0 victories in 18 years really!?? I knew your manager is a beast [both share a manager] but the

fact that you are still in MotoGP can be just magic."

Social media lapped this up, the 'damn the snowflakes' brigade quick to wrongly pass it off as 'just banter'. But there's something about a MotoGP legend completely devaluing a fellow rider's career for no reason other than petty spite that doesn't sit well.

For starters, sub-standard machinery seems to have followed Espargaro through his career. But let's not forget, his efforts in developing the Suzuki in 2015 and 2016 had a big hand in the success it's enjoyed in recent years. And as the 2021 season nears, that same effort looks like it's steered Aprilia into a position where it can close the gap to the front with its new RS-GP. Lorenzo's judgement was uninformed as much as it was unnecessary.

But the most concerning thing about this unfathomable fall from grace displayed by Lorenzo is that it shouldn't be happening in the first place. I think it must be stressed that, as much he hasn't helped himself at points in his career, Lorenzo isn't a bad guy. He's a hugely charitable individual, getting involved in all sorts of causes to help improve people's lives. And he knows how to not take himself too seriously — he reached the final of Spain's version of *The Masked Singer* earlier this year.

So, you have to wonder whether Lorenzo is actually happy with life. By the end of his MotoGP career, he'd had enough of putting his body at risk after a bruising and difficult sole campaign on the factory Honda in 2019. And even when the opportunity of a Ducati return for 2021 came fairly close, the parts of the game he didn't enjoy came flooding back into his mind, too strong for him to brush aside to race again.

But there's no doubting that Lorenzo still had more to give. After three world championships in the premier class, 47 victories and 114 podiums, Lorenzo's talent wasn't spent at the end of 2019 — it was just his desire. But many an athlete has had a hard time adjusting to life outside of the thing that consumed their entire existence for so long, regardless of how wealthy it made them.

Social media only gives a snapshot of a life, and often it's just the highlights reel. Just because someone's life looks wonderful through an Instagram filter doesn't necessarily mean that's the reality.

Of course, if Lorenzo wants to continue to remind people of his career statistics on social media, then that's his prerogative. But I sincerely hope he decides to put his phone down and enjoy whatever sunkissed part of the world he's spending his retirement in, because he's earned it.

More importantly, the more he continues with incidents like these, it steadily chips away at his legacy. And that is tragic, because the guy was a monster motorcycle racer...*🔥*

NEXT WEEK MOTOGP SEASON PREVIEW



I would lay money that Murray is 'up there' now with Stirling, discussing who is going to win the 2021 F1 championship

DERMOT BAMBRIDGE

Murray's voice a breakfast accompaniment

I was very privileged to have known Murray Walker quite well. When I was PR manager for Goodyear F1 Racing, Murray was at every race too, and Goodyear and the BBC shared the same caterers. This meant that we all queued up together for our breakfasts at most races, often at some unearthly hour and in the cold. Whether you were at the same table or not, Murray's unique voice could invariably be heard across the room (or tent).

I remember one morning in Australia, Murray told me about one of his first visits to the grand prix there. He believed that nobody outside the UK had ever heard of him, let alone in Oz. Someone had told him about an excellent bookshop in Sydney, so along he went. As he perused the books, the owner came up and asked him if he could help. Not looking for anything in particular, Murray asked if he had a certain edition of Autocourse, which, due to its rarity, was particularly valuable but did not mention the fact. Much to his amusement, the reply was 'Nice try Murray'. He was very well known all around the world of course.

I last met Murray at the media day of the Silverstone Classic in 2018. He was 94 and as bright as a button and we chatted about old memories and friends. This was possibly his last visit to the circuit, where he did his first grand prix TV commentary 72 years ago in 1949.

I would lay money that he is 'up there' now with Stirling, discussing who is going to win the 2021 F1 championship.

Dermot Bambridge
Silverstone

Class act who made a fan feel at ease

I was deeply saddened to hear the news of Murray Walker's passing. His high-octane, fast paced commentary and infectious energy made even the duller of races a joy to watch.

I was fortunate enough to meet Murray at a book signing for his first autobiography, post-retirement (not that he ever fully retired). Completely starstruck, I was rendered speechless in his presence. Sensing my embarrassment, he mitigated the



situation by simply saying, in that oh so familiar style and tone, 'Thank you, young man. Good evening!'.

A class act. Thank you, Murray. Rest in peace.

Richard Newell
Byemail

Matchless enthusiasm, excitement and knowledge

Very sad to hear of the passing of Murray Walker. Being in my fifties now, I grew up with Murray's commentaries, and I'm sure to millions of motor racing fans around the country and indeed the world, his enthusiasm, excitement and knowledge was one of the reasons we love our sport.

RIP Murray.

MA Smith
Byemail

Signing off

Dear Murray,
Sadly, this time you are not very much mistaken. And I've got to stop now, because I've got a lump in my throat.

In sorrow,

Graeme Innes-Johnstone
Elland, West Yorks

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F1 2021

TEST REVIEW





HOW RED BULL WON F1 2021 PRE-SEASON TESTING

Last year, Mercedes was on top in testing and went on to dominate. Now, can Red Bull maintain the initiative and turn its early form, and its rival's travails, into victory?

ALEX KALINAUCKAS

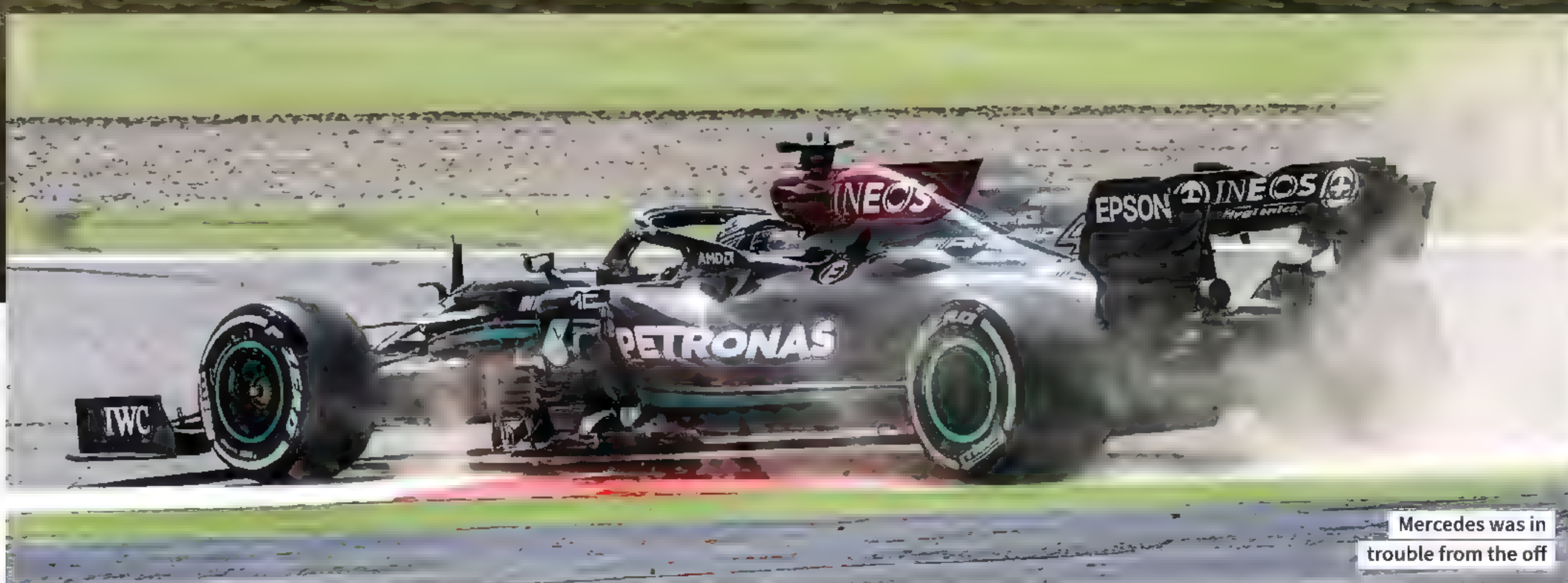
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IMAGES

And just like that, Formula 1's 2021 pre-season is over. The three days of action in Bahrain last week comprised the championship's shortest testing period — a necessary restriction caused by the COVID-19 pandemic's economic impact and the decision to carry over most of the 2020 car designs. But the post-testing picture in 2021 is wildly different to how it appeared a year ago, mainly at the front of the grid.

In 2020, Mercedes topped the times and looked in full command — other than its reliability dramas — while Red Bull was all over and off the road, and down the order too. In 2021, the exact opposite played out in Bahrain, except that Mercedes still suffered on the reliability front and Red Bull did not. For F1 fans turned off by Mercedes' metronomic success since 2014, this is a tantalising moment.

F1 has been here before, of course — most recently in 2019, when Ferrari looked in command after testing concluded, only to mess up at the season opener and never regain the initiative. So, it's important to recognise that this may be another false dawn, and Mercedes' astounding run of success means it has earned the right not to be quickly written off. But, at the same time, we should note that the 2020 season did play out exactly as testing suggested it would. Last year, Mercedes dominated while Red Bull floundered as it arguably never really solved its handling issues, even though it did improve significantly through a series of aerodynamic updates.

This progress led to Red Bull's walk-off win in Abu Dhabi and, when testing got under way last Friday, the day-one results indicated that it had maintained its momentum. McLaren's Daniel



Mercedes was in trouble from the off

“MERCEDES’ ASTOUNDING RUN OF SUCCESS MEANS IT HAS EARNED THE RIGHT NOT TO BE WRITTEN OFF”

Ricciardo led the way in the first session, where high winds and high temperatures meant the teams had to conduct their initial car installation and base aero tests in less than ideal conditions. Come the afternoon, things got even worse, as a dramatic-looking sandstorm rolled in.

With time so precious in 2021 and the possible repeat conditions impacting the season opener, the teams did not

opt to sit back and wait for things to improve. Max Verstappen eventually moved to the head of the day-one times with a run on the C3 medium tyres in the final hour of running — between 6 and 7pm local time, when conditions were generally best for overall performance running throughout the test. Other than a half-spin exiting the Turn 3 right kink at the end of the day’s first hour, which suggested Red Bull’s rear handling woes had not been fully solved with the RB16B, the team had had no issues.

“It was just a gust of wind,” said Red Bull team boss Christian Horner about Verstappen’s spin. “The track conditions have been pretty tricky out there. Max reported he’s reasonably happy with the car. There’s obviously areas to tune, but no fundamental [problems].”

It also seems that the drivers are having to be more careful >>

with throttle application as a consequence of the new floor rules, and the area where Verstappen went around is a critical acceleration zone.

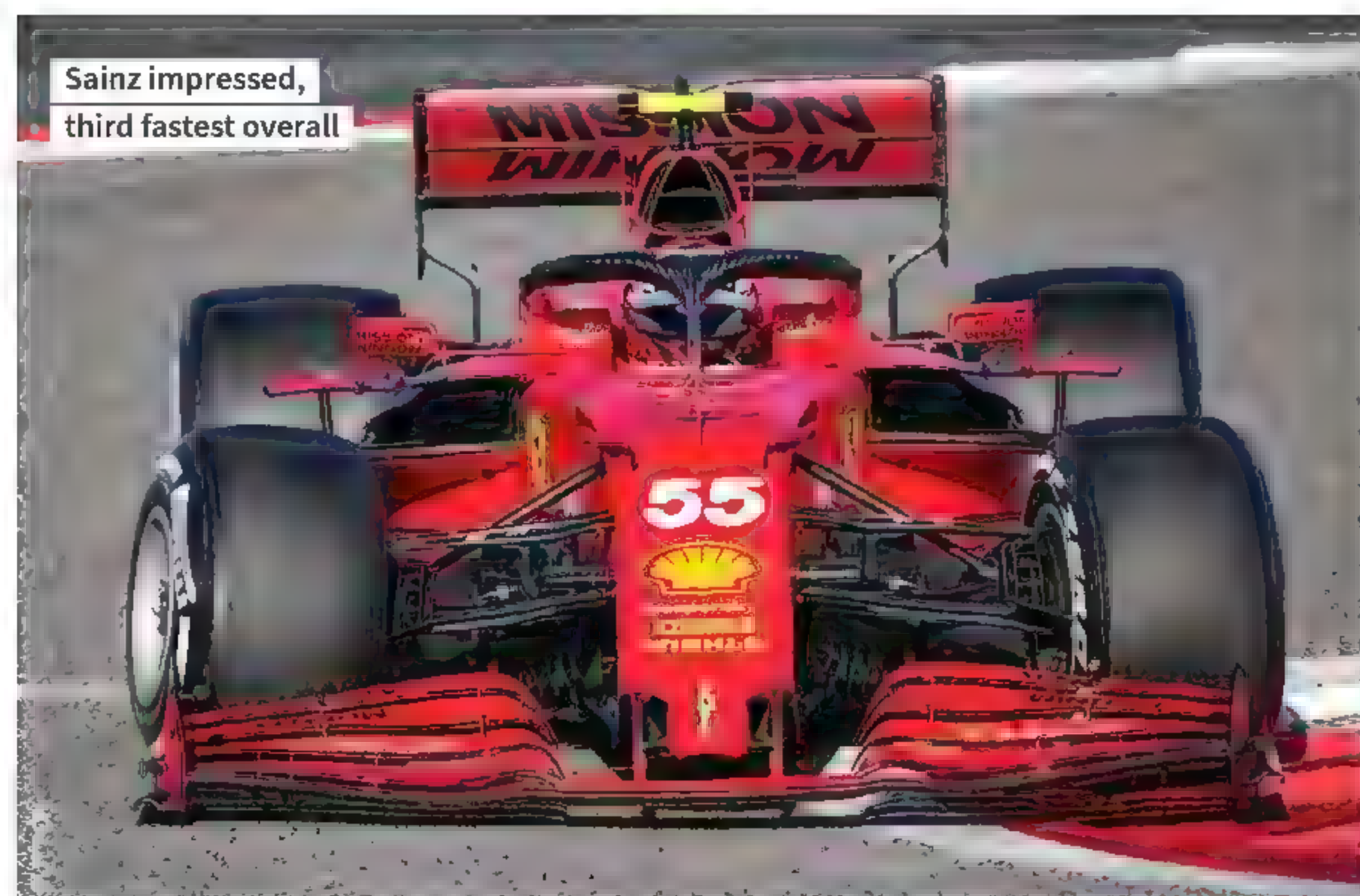
A lack of fundamental problems was not the case at Mercedes. In fact, the team was in trouble from the off when it detected a gearshift problem that “came out of nowhere”, according to team boss Toto Wolff, on Valtteri Bottas’s installation lap. The team was forced to replace the gearbox, and Bottas lost all but the final 40 minutes of the opening four-hour session. The knock-on effect of the repairs and detaching the aero rake that Bottas had been running late in the opening session (never a fast job) meant Lewis Hamilton was late out in the second period. The net result was that Mercedes’ track time lost on day one was pushing five hours.

The reigning champion squad’s problems continued on day two. In another reversal from 2020, it appeared last weekend that Red Bull – which spent its two 2021 development tokens at the rear of the car, making adjustments to its gearbox carrier and rear suspension – had in fact made major progress on solving the rear-end instability that caused its drivers such problems in 2020, while the Black Arrows drivers were struggling with precisely the same problem on corner entry. Hamilton and Bottas were regularly turning in the wrong direction at the critical Turn 4 stop, the tricky Turns 9/10 double left and the fast, sweeping left of Turn 11 as they had to urgently catch the snapping W12.

This happened to Hamilton again as he ran through the demanding Turn 13 right-hander at just past the halfway point of the second morning, although it’s entirely possible that he was caught out by a sudden crosswind. The Mercedes slipped off backwards and became beached in the gravel. The team lost nearly another hour as it was recovered to (and checked in) the pits, where Hamilton looked rather dispirited after hitching a lift back.

Things looked better for Mercedes when Bottas took over that afternoon/evening. While Red Bull gave Sergio Perez the perfect chance to learn its critical race procedures with a full race distance run in day two’s second session, forgoing any fast performance running, Mercedes finally appeared to have made a step in the right direction. Bottas racked up 58 laps, matching Hamilton’s session-one total, without incident. Things also seemed much calmer behind the wheel – Mercedes was, after all, still chasing the set-up “sweet spot”, said Hamilton – as Bottas set the fastest time of day two, a 1m30.289s on the C5s in the evening’s final half hour.

Both of F1’s leading squads continued to make progress on the final day, when Mercedes continued its practice of swapping drivers at the halfway point, something Red Bull finally adopted here to



give Verstappen and Perez an even split. In the second session, both teams went for performance runs, with conditions at their best of the test overall – low wind, cooler temperatures. And it was here that Red Bull really ‘won’ testing.

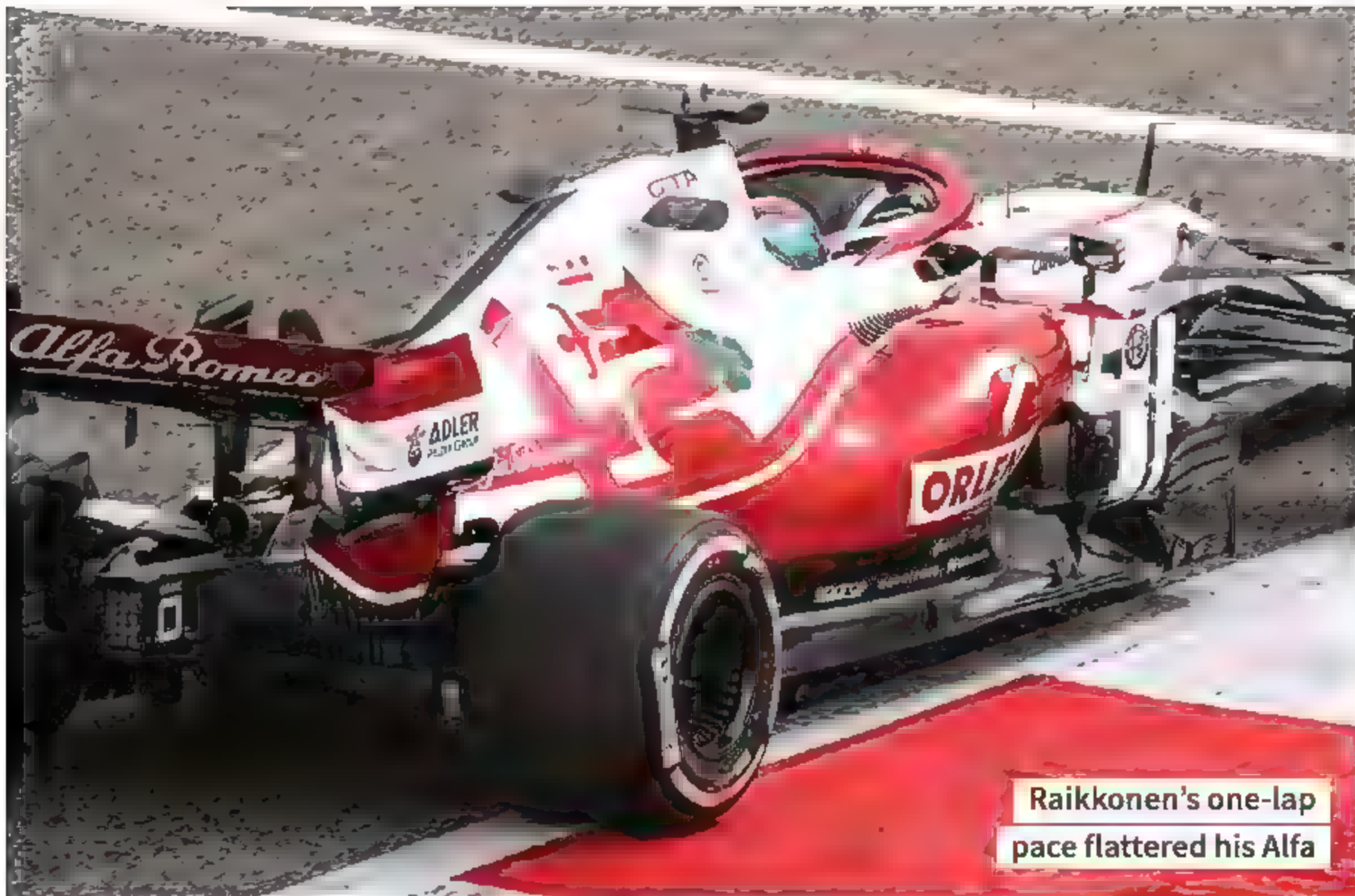
Of course, there were no points handed out, but setting testing’s best times lets teams seal early advantages and gives control of the narrative ahead of race one, especially if their closest rival hits more trouble. And this is what happened for Red Bull.

The final hour of testing became an enthralling spectacle, as Verstappen, finally running the softer tyres for full-on qualifying simulations, traded best times with new AlphaTauri ace Yuki Tsunoda. They both managed to lower the fastest time to date despite making mistakes, while Tsunoda also appeared to be using a bizarre DRS trick to open his rear wing much earlier than would be allowed during a grand prix weekend in Bahrain. Verstappen prevailed, his 1m28.960s set on the C4s, to Tsunoda’s 1m29.053s on the softer C5s (see page 27).

Carlos Sainz Jr vaulted up the order with just under an hour of testing to go. His 1m31.070s was notable because he did it on the C2 hard tyres, but he later used C4s to slot Ferrari in at 0.651 seconds adrift of Verstappen’s best, in third overall, just ahead of Alfa Romeo’s C5-shod Kimi Raikkonen.

Sainz had had to trail back to the pits stuck in fourth gear after his C2 run, with a hydraulic issue suspected as the cause and,





although he quickly returned to action, it was Ferrari's second reliability issue of the test. On day one, Charles Leclerc had brought out the red flags late in the first session when he stopped with what a team statement called an "anomaly with the combustion". This was one of only three red flags from across the three days – the others being Hamilton's beaching, and the left-hand side of Red Bull's engine cover blowing apart as Perez overtook Nicholas Latifi's Williams after his race run late on the second day. This was the only real moment of drama for Red Bull.

Hamilton put Mercedes fifth in the overall times, but the team ended testing firmly knocked from its traditional pre-season perch: up top, in control. In fact, Hamilton's flying-lap entries in the final hour rather summed up Mercedes' test overall. The world champion gained time on each of three C4 runs, going from 1m30.928s to 1m30.391s, then he took the C5s and moved to 1m30.025s, but he never looked like matching Verstappen or Tsunoda.

Then it happened. After Hamilton had spent a warm-up lap carefully conditioning his second set of C5s, he lost the W12's rear as he gunned it exiting the final corner, and spun wildly. He gathered things up and set two more flying laps on that rubber, but did not beat his first C5 time. So, although things looked calmer overall for Mercedes in the second half of the test (two understeer-induced offs for Bottas on the final morning aside), Hamilton's wild spin was the image with which it



finished the pre-season. Far from ideal.

"We've made a bit of progress with the balance on higher fuel and the car was more predictable, but we can see from the data we've collected over the last few days that on race pace, we're not as quick as Red Bull," said Mercedes trackside engineering director Andrew Shovlin. "The lower fuel work was a more confusing picture; we didn't gain enough and we need to go and look at our approach as far too many cars were ahead of us on pace."

Verstappen was, naturally, satisfied. He called 2021 testing "definitely" the best pre-season he's had as a Red Bull driver, but a comment he made on day one was perhaps more telling for the coming year. "I had a good balance in the car and it just felt nice to drive," he explained. "It was very, how do you say, predictable."

THE LONG-RUN PICTURE

As ever in testing, it's very tricky to sort a long-run order given the many variables concerning fuel loads, engine modes or a subtle lift exiting a corner, but Autosport nevertheless assembled a selection of 'race' times to dig into. We ignored the times set in the unrepresentative conditions of the first day, where the teams were mainly doing their basic install and set-up work in any case, and concentrated on C3 long-run pace – the middle Pirelli compound was run by all 10 teams on high fuel on days two and three.

Add in the single-lap order, reliability concerns and the suggestions from the teams and drivers themselves, and it's possible to form a particular order from testing (but don't count on this being the Bahrain GP grid!).

Perhaps because it was so far behind in its programme, Mercedes didn't do any full race-distance simulation work, preferring instead to take set runs at a consistent pace, with a set amount of fuel on board. Its best run with such parameters came in the hotter, and less ideal, morning conditions on the second day. Red Bull ran for much longer on the C3 times we assessed, and that was in the middle of Perez's full race trial in day two's twilight, so this goes some way to balancing out the conditions between the top two teams.

Red Bull was in front with an average of 1m36.769s over 16 laps, compared to Mercedes' 1m36.998s over 11 laps. McLaren and Alpine actually logged the best C3 stints of the 10 teams (1m34.789s average versus 1m36.514s), but these came from the end of race simulations in the final session, when fuel would likely have been burned off, plus their stints are the shortest we calculated at nine and 10 laps respectively.

We've got Red Bull placed ahead of Mercedes in our theoretical pecking order because it had a smooth test overall, topped the times and is ahead in our C3 comparison. But that does not make Red Bull the favourite for 2021 given all the historical examples of Mercedes stunning the field when it really matters.

AlphaTauri (which did a C3 average of 1m37.058s over 13 laps) looks to be nimble, exciting and very strong overall, with its >>

"SETTING TESTING'S BEST TIMES LETS TEAMS SEAL EARLY ADVANTAGES AND GIVES CONTROL OF THE NARRATIVE"





drivers able to lap consistently and smoothly throughout testing – Tsunoda’s run of 15 ever-better personal best laps during a race run on the C2s, either side of a wild spin, was really impressive. We’ve got it ahead of McLaren and Alpine in our testing pecking order because of its sensational one-lap pace on Sunday (although Tsunoda’s DRS antics are a notable caveat here).

McLaren looks to have made a very successful transition back to Mercedes power – it suffered none of the reliability issues seen at the works squad and at Aston Martin – while Alpine generally came in behind its orange rival on the long run averages we crunched over all three days, hence the two squads are in that order.

Ferrari is very difficult to place. Sainz helped it leap up the overall order late on day three, with a respectable run on the harder of the two soft tyres, but it’s the team’s long run pace in our C3 comparison that lets it down, as it was behind both Alfa Romeo (1m37.413s over 13 laps) and Aston (1m37.659s over 12 laps), with 1m37.760s over 15 laps. Ferrari is nevertheless happy that its power deficit will not be as big as it was in 2020, and on the first day Leclerc went through the track’s speed trap 3km/h (1.9mph) faster than in 2020 Bahrain GP qualifying.

Aston Martin is also difficult to place. Its reliability problems kept it from doing any serious performance running, with Sebastian Vettel losing the chance to do any late flying laps in the final evening session because of a turbo boost pressure issue. That happened after he’d come to a halt with an unspecified problem in the pitlane on the opening morning, and lost basically all of the second morning to a gearbox change. Aston was also well down in our C3 comparison. But this was the third fastest car in 2020, and it could well have been running more fuel during the Mercedes-like

consistent high-fuel trials (the team did not do any complete race distance simulations) that we observed. So, it could yet be that it has carried over its place from the 2020 pecking order, and its significant testing struggles – Vettel estimated he was “100 laps” short of desired mileage – masked its true potential.

Although Alfa Romeo finished well up the overall order on one-lap pace (and compared favourably on the C3 long runs), it did so on the softest rubber, which several midfield squads avoided or had trouble running overall in testing. For that reason, and the same applies to Williams (which had a C3 average of 1m38.091s over 12 laps), we’ve got the 2020 ‘Class C’ squads grouped together again.

It seems that, based on a combination of overall pace and our C3 comparison, Haas (C3 average of 1m38.189s over 14 laps) finished 2021 testing at the rear of our theoretical pecking order. Haas also lost the opening session due to a hydraulics problem and a gearbox change, which cost rookie Mick Schumacher valuable track time.

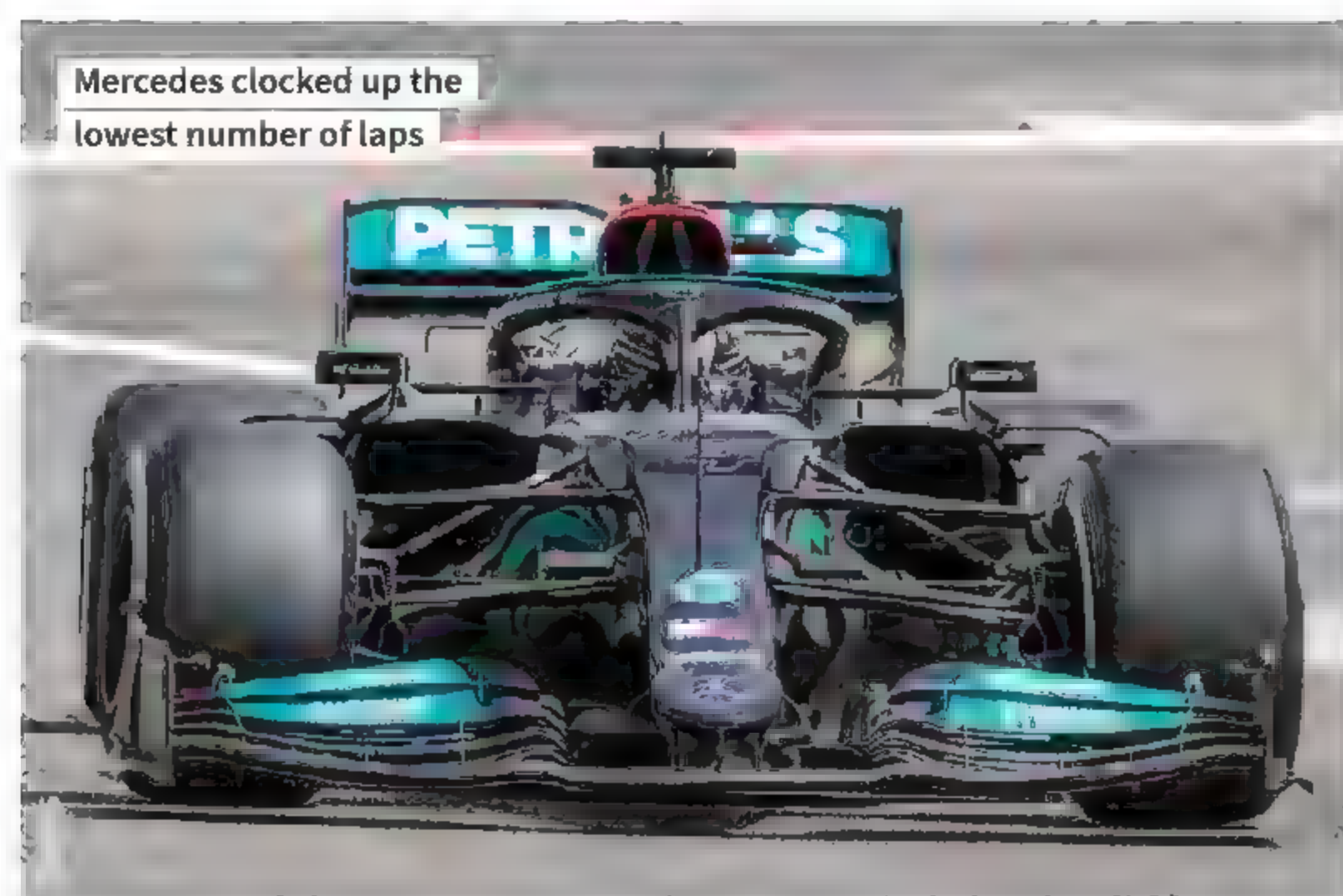
WHY MERCEDES HASN'T LOST ITS 'FAVOURITE' TAG

Mercedes had by far the best car in 2020, even though Red Bull eventually developed its way into contention. It’s conceivable that the Black Arrows were holding something back in testing, which perhaps explains its lack of headline pace.

But at the same time, it registered its lowest single-test lap total (304, the least of all the teams) since the first test in 2018, and *something* is awry with its handling. This is possibly explained by the theory that the changes to the floor rules for 2021 have hampered cars running the low-rake philosophy more than those with high rake – ie the respective philosophies of Mercedes and Red Bull – even though speeds have not been significantly reduced overall. Hamilton even said after day two that the W12’s rear “doesn’t feel particularly great with this new regulation change”.

The team does have something of an ace up its sleeve, in that it held a filming day in Bahrain two days ago. Performance runs in such outings aren’t allowed, but it will still be helpful to have additional running to go alongside all the time for data analysis (that all teams will do) in the coming two weeks. Arguably, had Mercedes held its filming day pre-testing, it may have avoided losing essentially one session to the gearbox issue...

The final thought on Mercedes is this: 2021 testing has been the exact opposite of smooth for F1’s current dominant team. Red Bull should be extremely confident from its running last weekend, and deservedly so. But the championship has been here before – Mercedes simply cannot ever be written off. *W*



TESTING DATA, SAKHIR, 12-14 MARCH

BAHRAIN TEST TIMES

POS	DRIVER	CAR	DAY ONE	DAY TWO	DAY THREE	TYRES FOR FASTEST LAP
1	Max Verstappen	Red Bull-Honda RB16B	1m30.674s	-	1m28.960s	C4
2	Yuki Tsunoda	AlphaTauri-Honda AT02	1m32.727s	1m32.684s	1m29.053s	C5
3	Carlos Sainz Jr	Ferrari SF21	1m31.919s	1m33.072s	1m29.611s	C4
4	Kimi Raikkonen	Alfa Romeo-Ferrari C41	1m33.320s	-	1m29.766s	C5
5	Lewis Hamilton	Mercedes W12	1m32.912s	1m33.399s	1m30.025s	C5
6	George Russell	Williams-Mercedes FW43B	-	-	1m30.117s	C5
7	Daniel Ricciardo	McLaren-Mercedes MCL35M	1m32.203s	1m32.215s	1m30.144s	C4
8	Sergio Perez	Red Bull-Honda RB16B	-	1m31.682s	1m30.187s	C4
9	Valtteri Bottas	Mercedes W12	1m36.850s	1m30.289s	1m32.406s	C5
10	Fernando Alonso	Alpine-Renault A521	-	1m32.339s	1m30.318s	C4
11	Pierre Gasly	AlphaTauri-Honda AT02	1m32.231s	1m30.413s	1m30.828s	C5
12	Lance Stroll	Aston Martin-Mercedes AMR21	1m31.782s	1m30.460s	1m36.100s	C5
13	Charles Leclerc	Ferrari SF21	1m33.242s	1m30.886s	1m30.486s	C3
14	Lando Norris	McLaren-Mercedes MCL35M	1m30.889s	1m30.586s	1m30.661s	C4
15	Antonio Giovinazzi	Alfa Romeo-Ferrari C41	1m31.945s	1m30.760s	-	C5
16	Esteban Ocon	Alpine-Renault A521	1m31.146s	-	1m31.310s	C4
17	Nikita Mazepin	Haas-Ferrari VF-21	1m34.798s	1m33.101s	1m31.531s	C4
18	Nicholas Latifi	Williams-Mercedes FW43B	-	1m31.672s	-	C4
19	Mick Schumacher	Haas-Ferrari VF-21	1m36.127s	1m32.883s	1m32.053s	C3
20	Sebastian Vettel	Aston Martin-Mercedes AMR21	1m33.742s*	1m38.849s	1m35.041s	C3P
21	Roy Nissany	Williams-Mercedes FW43B	1m34.789s	-	-	C3

The fastest time for each driver is marked in bold, with fastest time of the day in red. *Vettel used the C3 Prototype tyre for his fastest time.

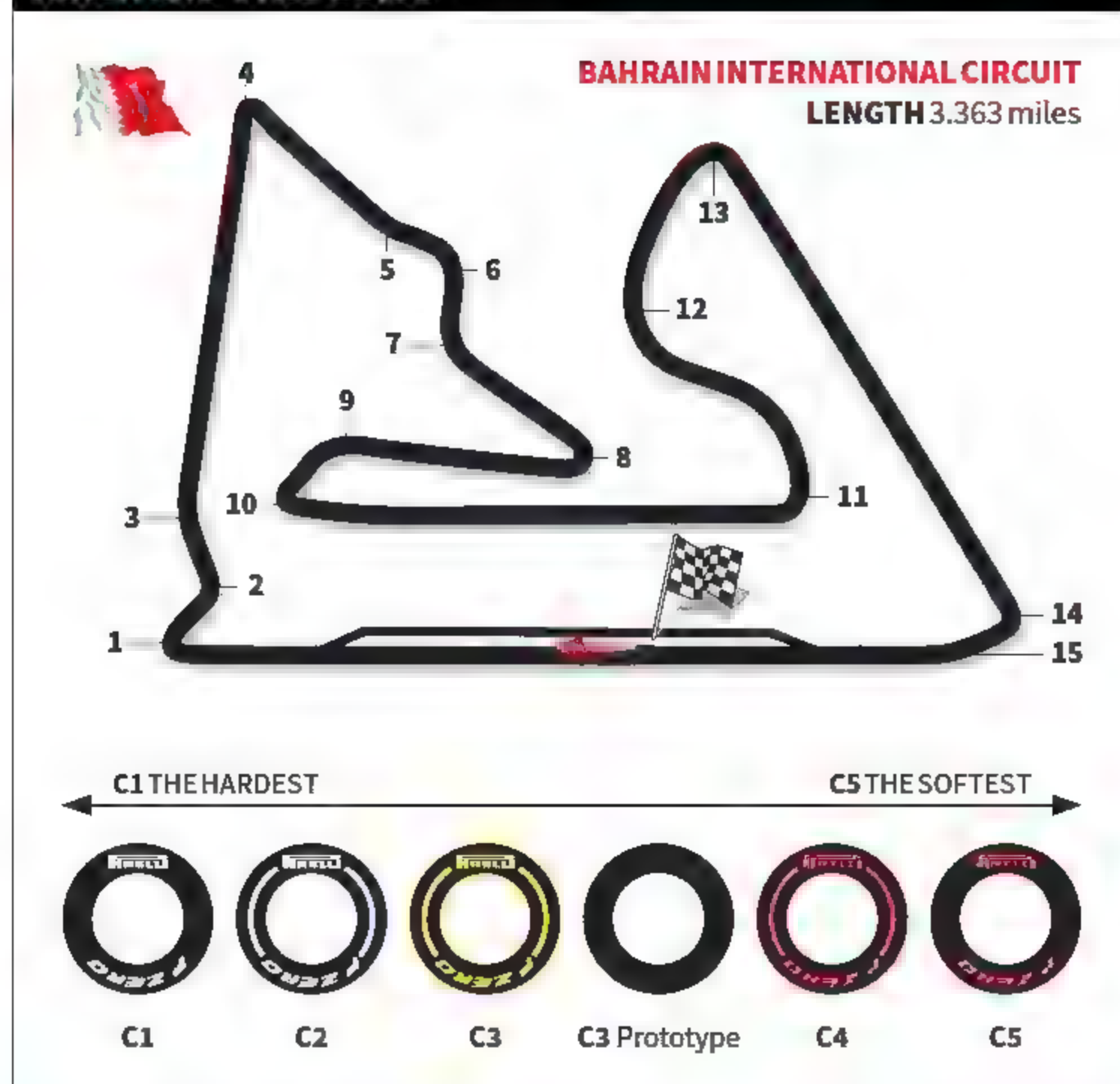
LAPS COMPLETED

POS	TEAM	LAPS COMPLETED	POS	DRIVER	LAPS COMPLETED
1	AlphaTauri	422	1	Gasly	237
=	Alfa Romeo	422	2	Raikkonen	229
3	Ferrari	404	3	Mazepin	213
4	Alpine	396	4	Leclerc	212
5	Haas	394	5	Alonso	206
6	Williams	373	6	Verstappen	203
7	Red Bull	369	7	Stroll	197
8	McLaren	327	8	Giovinazzi	193
9	Aston Martin	314	9	Sainz	192
10	Mercedes	304	10	Ocon	190

POS	ENGINE	LAPS COMPLETED
1	Mercedes	1318
2	Ferrari	1220
3	Honda	791
4	Renault	396

11	Tsunoda	185
12	Schumacher	181
13	Ricciardo	173
14	Perez	166
15	Russell	158
16	Hamilton	154
=	Norris	154
18	Bottas	150
19	Latifi	132
20	Vettel	117
21	Nissany	83

TRACK AND TYRE GUIDE



TOTAL LAPS
COMPLETED
BY ALL CARS

3725

RED FLAG

3

NEXT WEEK

F1 SEASON PREVIEW 25 MARCH

Our bumper guide to the 2021 campaign

FERRARI SF21

JAKE BOXALL-LEGGE

Is this the car to arrest last year's slide? We can judge only so much by appearances, as what's likely to be key to the iconic squad's revival lies under the rear bodywork

PHOTOGRAPHY FERRARI

ENGINE COVER

Forward of the heinous green decal on the engine cover, Ferrari has retained the horns that it reintroduced to the F1 lexicon last season. They're less defined as Ferrari has increased the size of the intake, opting for a rounder shape by adding two extra openings either side of the triangular roll structure, but that allows the team to reduce the side of its sidepods. These horns should help tidy up the airflow before it reaches the rear wing. Within, the team has introduced a new gearbox and revised power unit, which could be the most important change of all...



Floor appears to be version run in practice in Portugal, but what it'll race with is another matter...

SIDEPODS AND FLOOR

Ferrari spent its tokens on revising its rear end and, like most teams, had used the top surface of the sidepods to sweep airflow down to the floor to help maximise the diffuser's effectiveness. It has done so again for 2021, but with a more pronounced tuck-in to help open up more of the floor available. With the reduction in floor size, many teams have attempted to

reduce the sidepod size even further to make more floor available to use, and Ferrari has done the same. It's unclear what Ferrari's approach to floor developments is at this stage, given that the team tried two separate designs over the course of 2020, but it seems to have launched with the curled-corner variant it ran during practice at the Portuguese GP in October.





FRONT END

Ferrari has stayed true to the thumb-tip nose designs used over the past few years, and has made a small change for 2021. Rather than squaring it off at the wing mountings, it has let the nose transition into the thumb-tip crash structure in more of a teardrop shape, and shuffled the mounting pylons inboard slightly. On the front wing, the second element is now united with the mainplane to leave the important tip vortex generation – which is fired underneath the front suspension to direct the front-wheel turbulence outwards – to the top three elements. The trailing edge of the endplate has been reworked to include a curved cut-out of the upper corner, with a fin at the rear of the footplate helping to turn airflow outwards.



BARGEBOARDS

Ferrari has added a collection of new fins to the top of the nose, and has opted for an aggressive-looking quartet of winglets either side that seem to be turning airflow out and around the car. There are changes to the bargeboards too, with a remodelled leading edge, perhaps as a legacy of the new talon-like fins on top of the chassis. It retains the twin-boomerang arrangement, mounted between the main bargeboard arrangement and the outer vanes mounted to the sidepods. It appears that, of those sidepod-mounted elements, the main piece (marked with the Radiobook decal) has been set down slightly compared to last year, perhaps to interact better with the redesigned sidepods. Between this and the outboard mountings for the boomerang elements, Ferrari has followed some of its competitors and opted for the shutter blind-style array that should help to divert airflow up and outwards.



HAAS VF-21

JAKE BOXALL-LEGGE

The last car to be revealed before the start of pre-season testing has not had any tokens spent on its development, so expect the team's 'transitional year' to be a challenging one

PHOTOGRAPHY **MOTORSPORT IMAGES**

DEVELOPMENT

Haas was the last team to formally unveil its car, when it took the covers off the VF-21 in the pitlane ahead of Friday's running at the Bahrain test. The new car features a considerable amount of carryover. Team principal Gunther Steiner revealed that the team had not spent any of its tokens on its 2021 machine, noting that the season is a transitional year for the American-owned squad. It struggled financially throughout 2020, so the decision to limit its progression for 2021 means that the team will give up a fair chunk of performance with little opportunity to claw it back. Haas may have a few new additions to the car at the Bahrain Grand Prix, but this is expected to be the extent of its development.



FRONT WING

There are a few detail changes to the front wing, particularly where the central neutral section ends. Last year, the mainplane split into three elements, united by a metal insert, where the front pair of elements had a very short chord length. This has changed; the third wing element is now free of the mainplane structure and that has allowed the team to introduce a greater curvature to that insert. This means there are now three tips available for the team to generate a stronger vortex, and allows the team to reduce the chord length of the third and fourth elements to help provide more flexibility for adjustments. The rest of the wing remains in much the same configuration as last year.



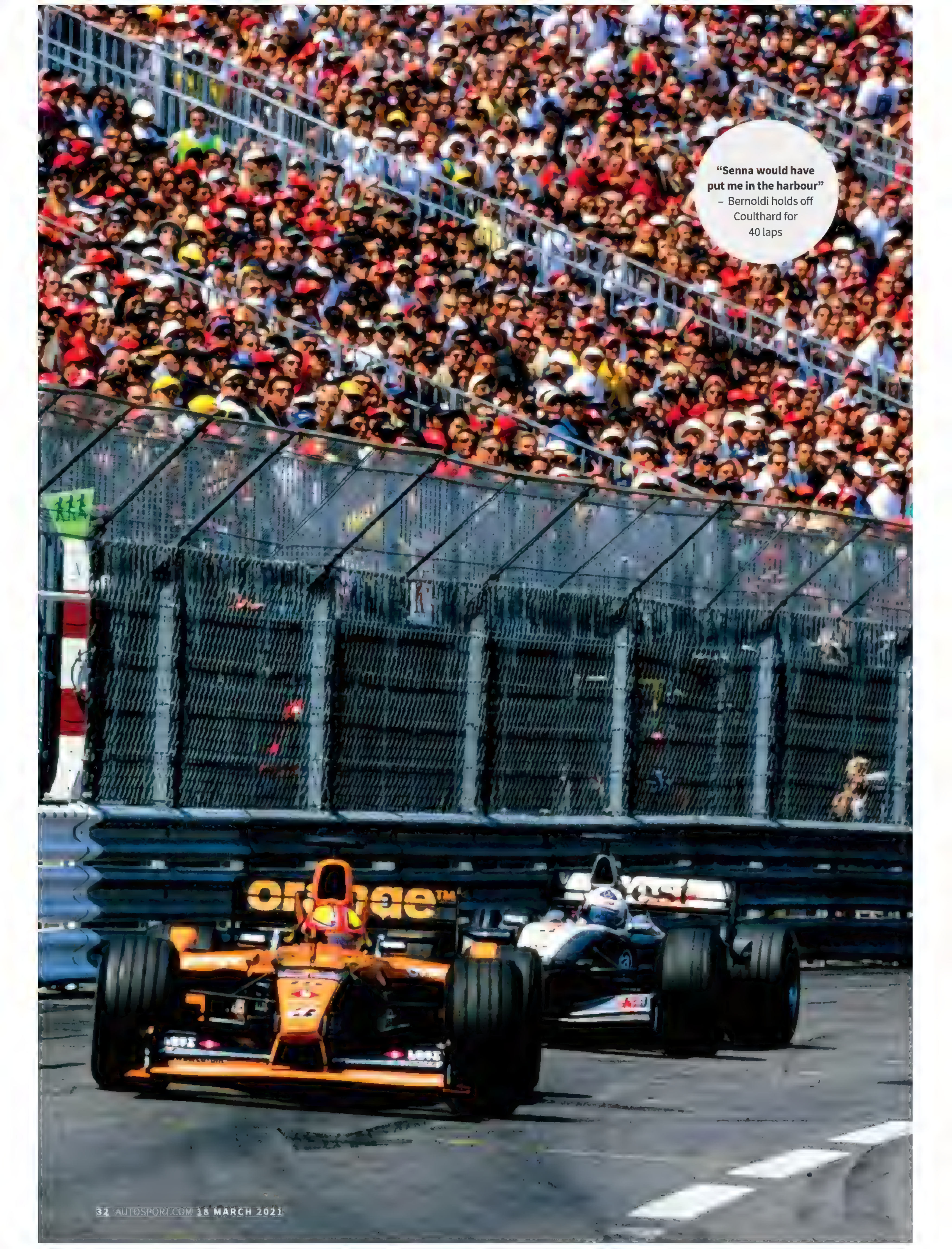
REAR END

Although Ferrari has updated its power unit for 2021, there are few packaging changes to the Haas, which has only really shuffled the bodywork opening at the rear further down. The team has also introduced a new T-wing, featuring a squarer shape; the team ran with two designs over 2020, with a single-element wing at the medium-speed venues and a rounder double-wing arrangement for the likes of Abu Dhabi and Hungary. By looping the two elements together, this limits the creation of any tip vortices, although teams have often added two fins to the outboard edges of the underside to place those vortices lower down.



FLOOR

The VF-21 does, of course, feature the mandatory new floor following the off-season cuts. This features a rib along the back, which extrudes forward and serves as a mounting for a winglet ahead of the rear wheel. This pairs with a curl on the rear corner of the floor, as used by a number of teams on their interpretations of the new floor regulations. Haas's additions seem to be an attempt to develop a vortex that can tuck in around the rear wheel and seal off the diffuser, ensuring that a reduced level of turbulence created by the wheel enters the diffuser space. The design is almost identical to the floor that ran during practice at the Abu Dhabi Grand Prix last year, albeit with a beefed-up scroll before the newly mandated exclusion zone.



**"Senna would have
put me in the harbour"**
– Bernoldi holds off
Coulthard for
40 laps



The forgotten member of F1's greatest rookie crop

The 2001 Formula 1 season unveiled three shining lights who would take the challenge to Michael Schumacher — but also delivered a harsh lesson in F1's cut-throat nature to the fourth member

JAMES NEWBOLD

PHOTOGRAPHY



Fernando Alonso and Kimi Raikkonen will mark the 20th anniversaries of their Formula 1 debuts when they line up on the grid for next week's 2021 season opener in Bahrain. If the cards had fallen differently, they might have expected to rack up many more than their combined total of three world titles, given the potential they showed in their rookie seasons with the backmarker Minardi and upper-midfield Sauber squads respectively.

Together with Colombian Juan Pablo Montoya, whose flame in F1 burned brightly but briefly with the Williams and McLaren teams before his departure for NASCAR, the trio's 2001 emergence represented a changing of the guard in F1. But their 'F1 debut' club had a fourth, often-forgotten member.

On the face of it, the Brazilian Red Bull protege partnering Jos Verstappen at Arrows had an anonymous year, scoring no points. But from being threatened with career oblivion by McLaren boss Ron Dennis in Monaco to his lucky escape when a flying wheel struck his car at Hockenheim, to convincing team bosses who were all set to eject him that he was worthy of a second season, Enrique Bernoldi's rookie campaign was anything but uneventful.

Bernoldi was something of a surprise signing by Arrows. Pedro de la Rosa had appeared safe in his seat, and Bernoldi's 16th-place ranking in his second season of Formula 3000 wasn't exactly much

to shout about. That result is deceptive though — fourth at Imola was lost to a gearbox problem, and two wins at Barcelona (where he'd qualified on pole) and the Nurburgring had gone begging due to a puncture and suspension failure respectively. Without those lost points, which effectively ended his title hopes and caused him to switch attention mid-season to testing duties with the Red Bull-backed Sauber team, he would have finished third in the standings — ahead of F3000 rookies Mark Webber and Alonso.

The 1998 British Formula 3 runner-up — "I should have won but I did so many mistakes, it was not lack of speed" — had raced for Helmut Marko's Red Bull Junior Team in F3000. Marko had earmarked a Sauber seat for Bernoldi, only for Formula Renault UK champion Raikkonen to appear out of nowhere to take that, so Bernoldi tested for Prost before a deal was agreed with Arrows boss Tom Walkinshaw. De la Rosa out, Bernoldi in.

"I knew I would have some bad press," reflects Bernoldi, one of four Brazilians on the grid that year along with Ferrari's Rubens Barrichello, Jaguar-then-Prost racer Luciano Burti and Alonso's Minardi team-mate Tarso Marques. "Even Rubens was not positive about what happened in my team. But I said the only way I can answer that is with performance."

The performances took a while to show in an A22 that, contrary to its promising testing form, was faster only than the Minardis. >>



“Arrows had a better year than Sauber in 2000 and somehow we were fast during winter testing, so me and Marko thought we were in a better place,” he says. “The results clearly show that something was making the car go faster than it could possibly go. When we got to Melbourne, we were not that fast anymore!”

Arrows anticipated that the tyre war between Bridgestone and F1 newcomer Michelin would lead to an increased wear rate and make two pitstops commonplace, so committed early to a small fuel tank. But this logic was proved misplaced, and the strategic limitations it created – “It would be for the first five laps maybe half a second faster than the others, but we would fall back to the same place where we started” – would prove a millstone around the team’s neck all year.

Combined with ex-Peugeot engines (badged as Asiatechs) that were well down on the power output of the benchmark Williams-BMW, a lack of downforce that made the car nervous to drive, and a “crude” traction control system that “was so harsh that it would unbalance the car”, conditions were hardly ideal for a rookie, but Bernoldi still outqualified lap-one overtaking king Verstappen (who scored the team’s only point with sixth in Austria) 10-7. “Jos, the way he drove, he was very aggressive and I was very smooth,” he explains. “I could handle a very pointy car for one timed lap and I think that was the biggest difference. I could be faster with the car the way it was.”

At a drying Spa, Bernoldi was on course for a top-seven grid slot, despite being sent out on intermediates when he’d requested dries, only to run out of fuel at the Bus Stop and end up 21st.

“There were things that could have been done better that could





have changed the way the season looked, but nobody knows them," he continues. "To be top-seven at Spa in my first year would have been recognised, unfortunately it wasn't there."

"I was happy with the performance [in qualifying] but in the races the reliability was really not there. All I could do was try my best in qualifying – that's what Red Bull always asked for. Once you're a Red Bull driver, and you are also an Arrows driver, you sort of have two bosses – Tom as the team owner, and Helmut Marko [representing] your sponsor. Who do you really answer to? That was a tricky situation."

Reliability indeed was lacking. After a rookie mistake in Melbourne when he crashed out on lap two, and getting caught out in the Malaysian monsoon along with several other drivers, he was hampered by six reliability-induced DNFs in the next eight races. But one of his finishes came in Monaco, the grand prix for which Bernoldi is arguably best-known.

Poleman David Coulthard's McLaren had stalled on the dummy grid, but the Scot quickly stormed up behind Bernoldi – who was smarting from a team order to allow Verstappen through – only for his progress to be frustratingly halted for the next 40 laps until the

“Somehow we were fast during winter testing. When we got to Melbourne, we were not that fast anymore!”

Arrows finally pitted. It sparked a war of words between McLaren boss Dennis and Walkinshaw, while everybody from Michael Schumacher ("Enrique did everything right") to Jackie Stewart ("scandalous") and Gerhard Berger ("Bernoldi's job is to drive hard, they were fighting for position") weighed in with their opinions.

"I'm sure that's not a great highlight," says Bernoldi, who finished ninth. "But friends of mine have been in F1 and nobody even remembers they were there, so at least somebody remembers that I have Monaco!"

Bernoldi reveals that he missed a shift into the tunnel when Coulthard first appeared in his mirrors – "I could only listen to the Mercedes engine behind, it was so much louder than mine, revving so much higher than mine" – but the pass he thought was inevitable never came. After Coulthard showed his nose at Mirabeau early on, Bernoldi "ran to the marbles and almost crashed" trying to leave him space. "That got me pissed off," he says. "I said, 'Now you're going to stay until I pit.'"

"I watched him for maybe 10 years since I was in go-karts and I knew he was not the most aggressive guy," Bernoldi continues. "Senna would have put me in the harbour if I don't let him pass, but David would not do that."

"I just was driving to not do a mistake. People say, 'You just blocked him,' but it is difficult because I'm driving a car which has no downforce, no power steering, no automatic gearbox and I'm holding the fastest guy on track. Honestly, I think he was not >>





BERNOLDI'S F1 CAREER STATS

Starts	28
Best result	8th (2001 German GP)
Best grid position	12th (2002 Austrian GP)
Points	0

Narrow escape from Burti's flying wheel was followed at restart by best F1 result

LIFE AFTER FORMULA 1

Since his abrupt Formula 1 exit in 2002, Enrique Bernoldi's career has traversed plenty of categories without making a lasting impact. Now based in California, the 42-year-old hasn't raced since 2016 (in one-make Lamborghinis), which he admits stems from finding it "difficult to be 100% committed" to any category other than F1.

"I always wanted to be an F1 driver, not a race car driver," he explains. "F1 is what I dreamed of, not racing in IndyCar or at Le Mans. Racing gave me everything I have, but I was only really interested when I had the chance to be part of F1."

When Arrows collapsed, he stepped down to the World Series by Nissan feeder series – Bernoldi won four races across the

2003 and 2004 seasons – and engaged Didier Coton as a manager to get him back into F1. That yielded a testing berth at BAR – "another world to what I used to drive, in every sense" – but, with Jenson Button, Takuma Sato and Anthony Davidson ahead in the pecking order, there was no viable route back into a race seat.

A season of Brazilian Stock Cars preceded a moved to Champ Car for 2008, but it was a struggle as the series was absorbed by IndyCar and transition teams had to play catch-up.

"I didn't like the ovals, being very honest," says Bernoldi, whose best finishes were fifth in his first road course start at St Petersburg and fourth at

Long Beach in the outgoing Champ Car Panoz. "Then I had a suspension failure [at Sonoma] and broke my hand – I had to get three surgeries. It all started to go a little bit downhill."

The football-themed Superleague Formula single-seater championship in 2009 didn't generate the same buzz, although he returned to winning ways at

Paul Ricard with a DKR-run Corvette C6.R in the FIA GT Championship. He joined the all-conquering Vitaphone Maserati squad for the inaugural season of the GT1 World Championship in 2010, and won at Interlagos, but opportunities dried up after a disappointing 2011 season with Nissan as his Platinum driver grading proved a frequent sticking point. It was here when Bernoldi "started to lose interest", and he now focuses on his family's business interests in real estate and attending sports practice with his three children.

"Something which is really routine is to wake up every Sunday at 6am to be on the ice practising [hockey] 7 until 10," he says. "Believe me, it's harder than being an F1 driver!"



Champ Car/IndyCar switch showed promise but fizzled out

Bernoldi tests for Sauber in 2000. His hoped-for seat went instead to Raikkonen



aggressive enough. Maybe the public didn't like it, but I think it was good for me and I did what I was paid for."

Famously, Dennis and Mercedes boss Norbert Haug sought Bernoldi out after the race to berate him for not allowing a championship contender through. How did he respond to Dennis's assertion that his defensive driving was "unsporting" and threat to "finish your career tomorrow"?

"I said, 'I'm sorry but if I was ahead of your car, it's because your car didn't start — that was not my fault,'" Bernoldi says. "Helmut Marko told me, 'Don't worry about whatever Ron said, if somebody likes racing here, they liked what you did'. In Canada after the press conference Schumacher came to me and said, 'If you get in this position again, you do exactly the same, because that's racing.'"

At Hockenheim, Bernoldi was fortunate to escape when a severed wheel from Burti's Prost landed on his sidepod, perilously close to his helmet. But he says his only thoughts during the subsequent race stoppage were about whether the damage it caused to his car could be repaired, and describes his drive to a career-best eighth that followed as "probably my best F1 race ever" after staving off pressure from Verstappen to the flag.

"We were like killing each other," he recalls. "I'd been faster than Jos all weekend and, on the grid, my engineer tells me he's going to level two of the rear wing; I was on three, so he wanted less wing. I looked at my engineer and said, 'OK, let's go one' because that was the minimum possible. He said, 'But you will kill your tyres,' and I said, 'Yes, but at least in a drag race I will beat him, and then the tyres I hope I can handle'. After that race, I got a letter from Arrows saying that they would not renew with me. I had my best race, but I was kind of jobless..."

But Bernoldi dug deep, and at each of the remaining races, except for Spa, he outqualified Verstappen — including in the spare car at Indianapolis after an engine blew on his first qualifying run.

"The spare car never had outqualified the race car that year, and that was the first time," he says. "I was doing what I could and with

the material that I had. At the end of the year we were lacking in power, we were lacking in downforce, lacking in everything."

Bernoldi's record against Verstappen, allied with his sponsorship, was enough to keep him in the seat for 2002. The Cosworth-powered A23 was an improvement that allowed new team-mate Heinz-Harald Frentzen to score points in Spain and Monaco, but frustrating reliability niggles meant Bernoldi didn't record a finish until Monaco, where he was elbowed off by Felipe Massa's Sauber.

A points finish was on the cards in a wet-dry race at Silverstone before a halfshaft failed, but the writing was already on the wall for the cash-strapped Arrows team — and Bernoldi's F1 career. After a token effort to qualify at Magny-Cours, the team made a final appearance at Hockenheim where, fittingly, Bernoldi retired with engine failure. He still had one more year on his Arrows contract, but would not start another grand prix. The timing couldn't have been worse, because the four-year deal he had signed with Red Bull, and which had started in 1999, was also at an end.

"Schumacher came to me and said, 'If you get in this position again, you do exactly the same, because that's racing'"

"It was a bad situation," says Bernoldi. "I couldn't get my helmets back, my overalls back, I couldn't get my paycheck back."

Bernoldi admires Alonso and Raikkonen for their "amazing" longevity and praises Montoya — "really the guy of the rookies" — but admits to a twinge of regret that his debut came at Arrows instead of the Sauber C20 that launched Raikkonen into a McLaren seat for 2002. "It was a bit frustrating with Kimi because he drove the car that I should have been driving," he says. "I didn't have a career like the other three guys had. Maybe if I started in the other cars I would, maybe not. Who knows? But it was like you go to a gunfight with a knife, or with a baseball bat!"

"We had some top-10 finishes, which at that time was worth nothing. My engineer liked it while Coulthard was behind me [in Monaco], but after that he didn't care because we didn't get a point. That was the situation. It was frustrating because it was only a few cars that could be constantly in the points. You needed somebody to break down, needed some luck somehow."

"With Instagram, Twitter, you see a lot of comments from people who don't understand anything. People might say, 'There is three great drivers and Bernoldi did nothing, Red Bull paid for him'. But are all the Red Bull drivers paying drivers? There is always a way to see things and unfortunately, having a bad car in 2001 and 2002, I couldn't show all the faith that Marko and Dietrich Mateschitz had in me." ❄



Malaysia 2002, another mechanical failure. Arrows failed to finish the season

The start
of the
season is
nearly
here



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REMEMBERING BRILLIANT BOB, 20 YEARS ON

Bob Wollek was killed while riding away from Sebring on 16 March 2001.

But many still remember why he became a sportscar racing legend

GARY WATKINS

PHOTOGRAPHY MCKLEIN AND  **motorsport**
IMAGES

I didn't think it was a stupid question, but my subject obviously did. He put his arm around me as we walked slowly through the Road Atlanta paddock and offered his answer — or rather explanation — in a forthright yet calm manner, all delivered with a trademark wry smile. That was Bob Wollek, the man, down to a tee.

My cherished memory of an incident that occurred at the inaugural Petit Le Mans in 1998 also reveals a lot about Wollek the racing driver. The Frenchman was less than a month short of his 55th birthday, and yet he was still competing at the sharp end of international sportscar racing. For the record, he was driving Champion Racing's Porsche 911 GT1 Evo that weekend, and my question concerned the brake issues that left the car he shared with Thierry Boutsen and Ralf Kelleners 10 laps in arrears in third position at the finish.

The quirky demeanour of the guy and the longevity of a career that only ended with his senseless death, when he was knocked off his bicycle ahead of the Sebring 12 Hours 20 years ago this week, are essential building blocks of the legend of Bob Wollek. So too, of course, are the four victories at the Daytona 24 Hours, but probably not quite as important as the failure to win the Le Mans 24 Hours outright over the course of 30 attempts spanning five decades.

Wollek never quite managed to crack it at sportscar racing's big one, but he came close on multiple occasions. He was on the overall podium no fewer than six times, had a pole position, and also notched up four class wins, though two of them were more or less meaningless, coming as they did in the days in the second half of the 1990s when GT1 and LMP machinery battled for outright honours. Another class win, on his final participation in the 24 Hours in 2000, was lost in the scrutineering bay.

In addition to the four Daytona victories, he won once at Sebring, and claimed 11 wins in world championship endurance racing and a total of nine in IMSA's Camel GT Championship. Then there were two titles and 24 race victories in the German DRM sportscar series. The only things missing from his CV were a world title and that elusive Le Mans triumph.

To describe Wollek as being one of the best sportscar drivers of his generation isn't quite right, because his career spanned multiple generations. That much is clear when you scroll down the list of teammates with whom he drove at Le Mans: Patrick Depailler, Jean-Pierre Jaussaud, Jacky Ickx, Stefan Johansson, Jorg Muller and Lucas Luhr were among his co-drivers at the 24 Hours. But what is correct is the bit about him being one of the best.

And probably one of the strangest. Wollek could come across as cold, arrogant and aloof. That explains why, although loved by many, he wasn't universally popular in the paddock. He was a Marmite person: you either liked him or you didn't.

He wasn't one to glad-hand sponsors, nor even given them the time of day if the mood didn't take him. Achim Stroth, longtime team manager at the Kremer squad with which Wollek built his reputation in sportscars in the 1970s, remembers the team winning the Suzuka 1000Km with its star driver and Henri Pescarolo in 1981. "Bob shook hands with everybody on the podium and left, leaving Henri to read out a speech that went on for 10 minutes, thanking the track, the sponsors, the crowd and, it seemed, everyone who was there," recalls Stroth. "That was the difference between their characters. Bob didn't care about all that stuff."

It was probably to the detriment of Wollek's career. He first raced for the Porsche factory at Le Mans in 1978, sharing a 936 with Ickx and Jurgen Barth. He was back again with the Group 6 machine the following year but, when the German manufacturer brought the 936 out of mothballs for 1981 as it prepared for its Group C entry with what became the 956 the following year, he wasn't part of the set-up. Wollek would race again for the factory as early as 1986, but he missed out on the glory years for its Rothmans-sponsored Group C machines with the likes of Ickx, Derek Bell and Jochen Mass driving.

Manfred Jantke, Porsche motorsport boss at the time, can't specifically recall why he overlooked Wollek when he was putting together his squad for 1981 and beyond. But he does remember the >>





kind of driver he wanted on the programme.

"I was looking for drivers with personality, who were good with the public, the press and sponsors," Jantke recalls. "That wasn't Bob, although he was a driver I absolutely trusted."

Wollek didn't endear himself to everyone. Kevin Jeannette, crew chief on Preston Henn's Swap Shop Porsche when Wollek notched up the first of his Daytona wins in 1983, doesn't pull his punches when talking about the Frenchman: "He could be an arsehole, but the way I looked at it, he was my arsehole, because he was driving my car. He would rub people up the wrong way, but then you have to have a certain amount of attitude to be a great race car driver."

Wollek was outspoken, for the most part in a dry, laconic way, his words usually delivered with that crinkle of a smile for which he was known. He said it how it was, or at least how he thought it was. That explains his use of the f-word on network TV in the US at Daytona 1983. Some believe that he made history as the first person to do so.

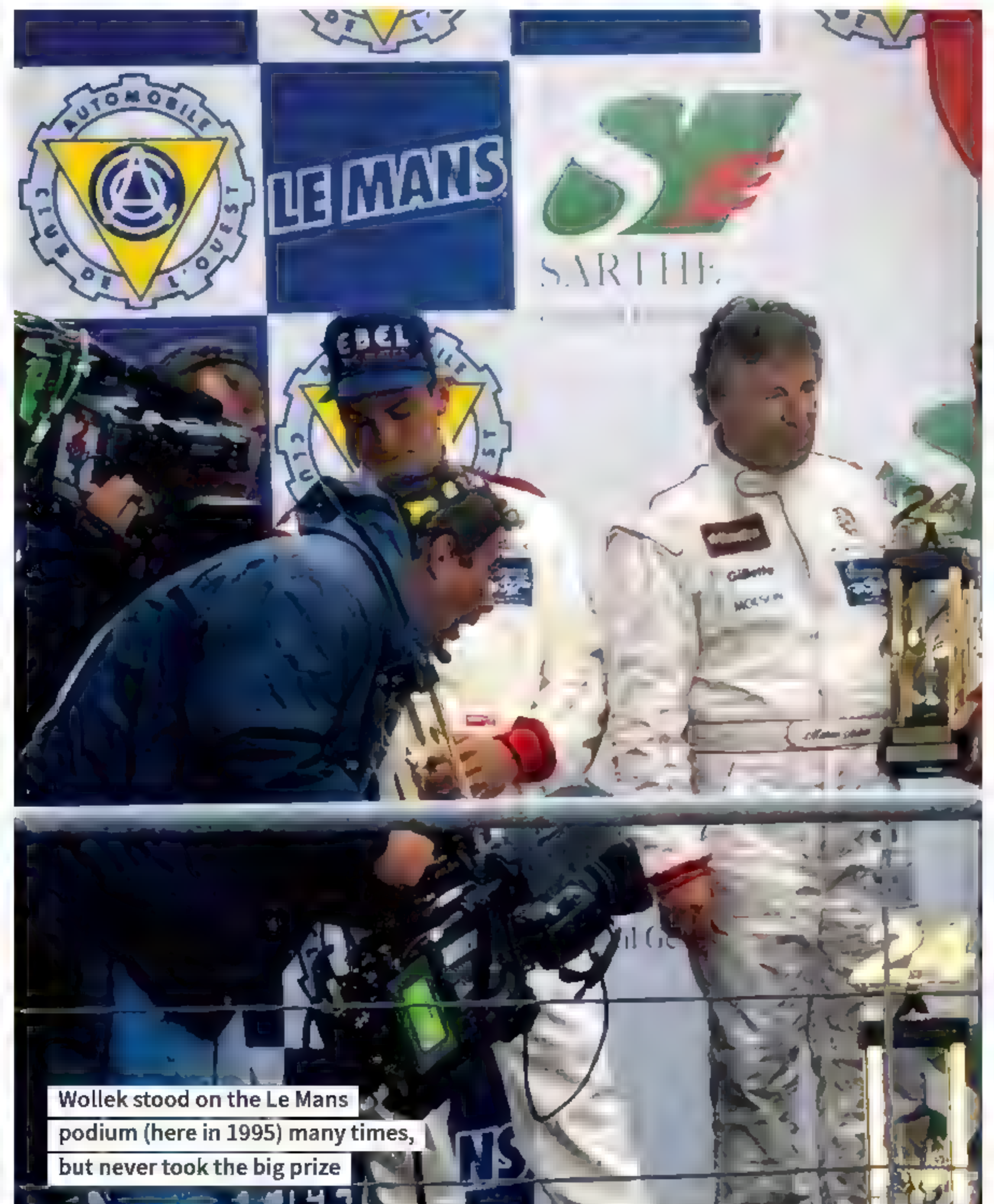
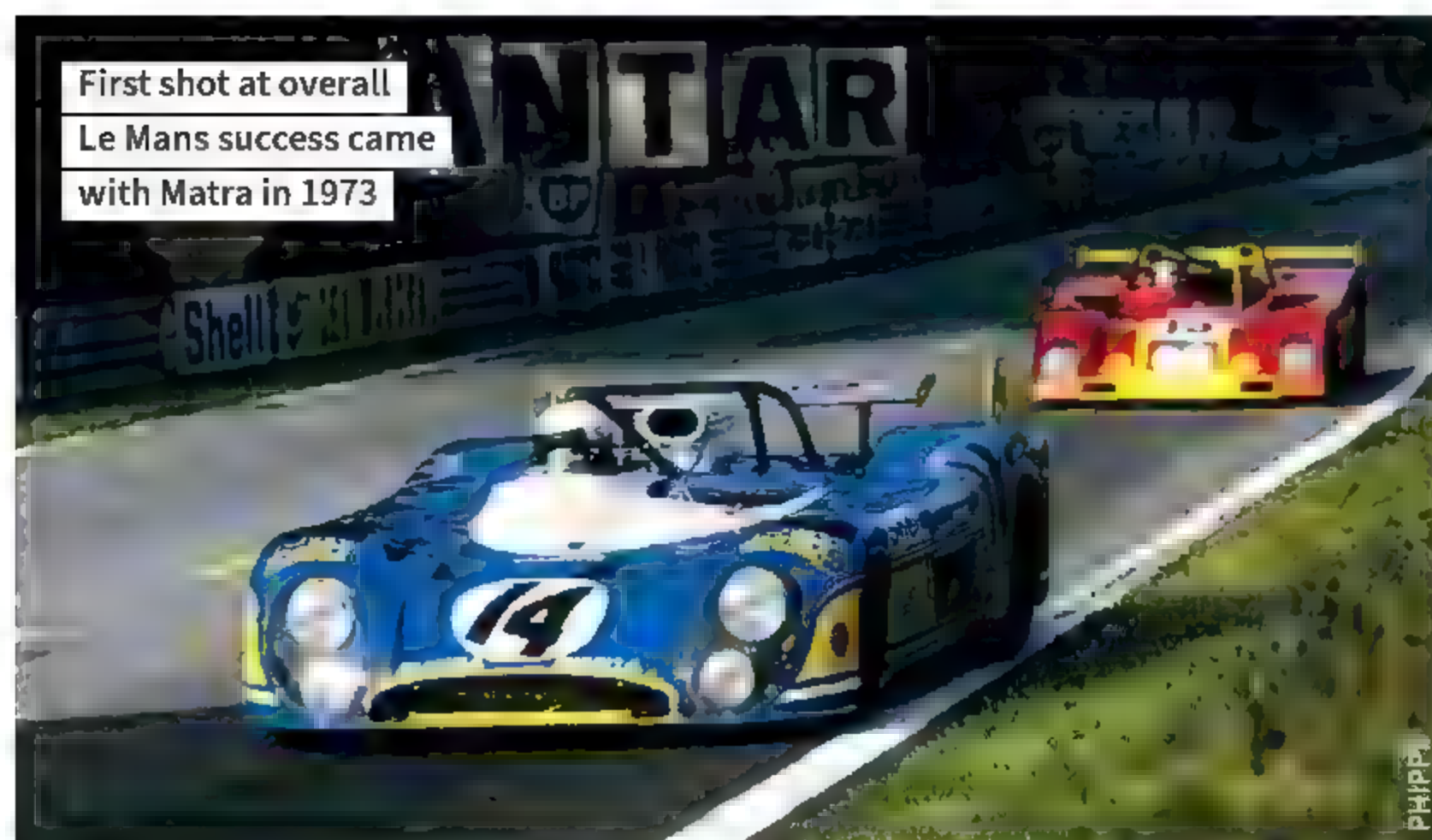
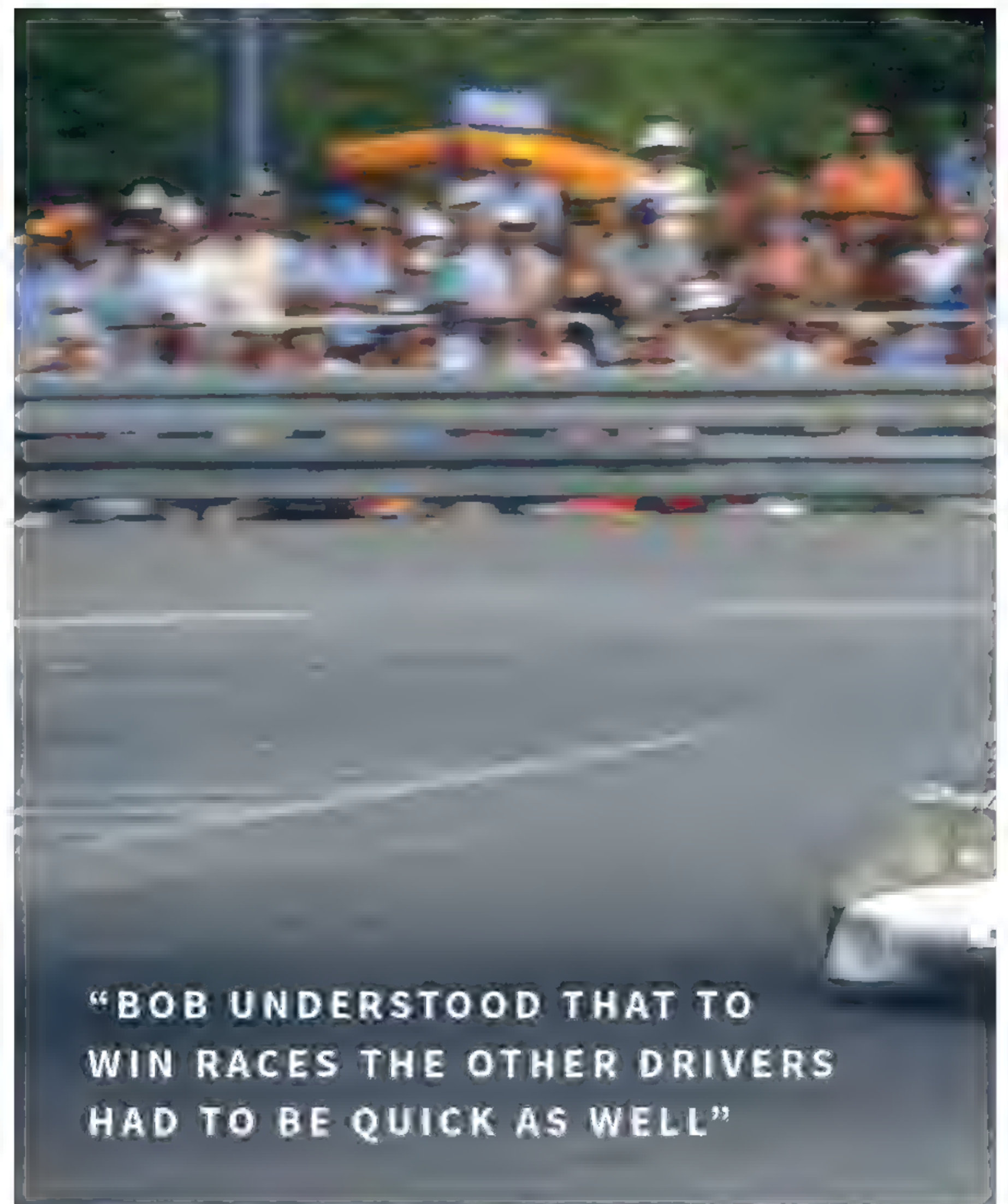
He'd just handed over his Porsche 935L, the Andial-built 'Moby Dick' copy developed for the previous season, that he'd been slowly hauling up the order in difficult conditions after early delays. He came into the pits on Sunday morning, strapped the next man in, and turned around to see Preston Henn and Claude Ballot-Lena, his two team-mates at the start of the race, standing on the pit counter.

It fell to Jeannette to tell him that Henn had added AJ Foyt to the line-up after the Indycar superstar's Nimrod-Aston Martin had dropped out of the race: "I said it was AJ Foyt, and you could tell Bob was livid."

A split second later Wollek had a TV camera in his face and a microphone under his nose, and was being asked what he felt about having a real life living legend in Foyt alongside him in the car. "Who the f*** is AJ Foyt?" was his famous reply.

Jeannette can't praise Wollek the driver highly enough. "He was definitely one of the best I ever worked with," he says. "I won't say who I think the very best was, but Bob was definitely on the same page."

Wollek was an all-round package as a sportscar driver. He had a deep





understanding of the discipline: he didn't make mistakes; he knew how to get through the traffic; he was technically strong; and he could eke out a tankful of fuel beyond most of his rivals and team-mates. Nor should there be any doubting his outright pace — witness his Le Mans pole position at the wheel of a Lancia LC2 in 1984.

"Bob understood that if he wanted to win races, the other drivers in the car had to be quick as well as him," says Stroth. "He would set up the car so they could drive it quickly, too. That was a big part of his success."

Stefan Johansson backs up Stroth's comments. The Swede had one international sportscar race to his name when he started driving with the Joest Porsche team in 1983 for a campaign with one of the first customer 956s that yielded victory for Wollek in the European Endurance Championship. He found his team-mate to be an able and willing teacher.

"He taught me all the little tricks that would have taken years' worth of mistakes to learn for myself," says Johansson. "One of the things I remember most is how he explained how to pace myself over a 24-hour race when we got to Le Mans. He showed me the importance of distributing your energy over the whole race."

"He could see the big picture. He'd been around long enough to not let his ego get in the way of trying to achieve a good result. He was the team leader, but he wasn't always demanding the fresh tyres and wanting to do the qualifying."

The serenity with which Wollek carried himself transferred onto the race track. "He made very limited errors," explains Stroth. "I think the reason for that was that you couldn't upset him out on the track. He was very calm. That helped a lot in traffic."

Famed Porsche engineer Norbert Singer, the architect of the 935 and 956/962, still marvels at Wollek's technical nous. "Sometimes we'd be doing set-up work at the test track at Weissach, and we'd make a change and he'd come straight back in and tell us we needed to do this or do that," recalls Singer, who became firm friends with Wollek. "I'd reply that the tyres hadn't even got up to temperature, so how could he tell what the car was doing? He'd say 'trust me'; I don't actually remember one time when he was wrong. Bob once told me he could >>

feel what the car was doing before he got to the end of the pitlane.”

Wollek wasn’t a trained engineer, but he had an intuitive feel for what the car was doing underneath him. Maybe it was because he started out as a skier, and a successful one at that: he bagged a trio of gold medals at the 1966 Winter Universiade in Italy. He’d already done the Mont Blanc Rally a couple of times when he failed to make the French national squad ahead of the 1968 Winter Olympics in Grenoble and swapped sports, entered the Volant Shell Scholarship organised at Le Mans, and then progressed into Formule France single-seaters.

Singer isn’t sure that Wollek’s previous sporting experience played a part in his technical understanding. “I think it’s something you’re born with,” he says. “You either have it or you don’t.”

Nor did he truly ever understand Wollek’s ability to stretch a tankful of fuel. “I can only say that it was all in little details,” says Singer. “He never explained how he did it, but he would sometimes look at what another driver was doing and tell me that it was completely wrong for the consumption.”

Wollek’s undoubted talents resulted in the ‘Brilliant Bob’ nickname that gained traction through the 1980s. The origins of the moniker are generally reckoned to lie with Autosport, and its former editor and sportscar correspondent Quentin Spurring.

Spurring recalls somehow describing Wollek’s brilliance at the wheel of a Kremer Porsche 935 in his report of the 1978 Silverstone 6 Hours, and then a sub-editor seizing on his words and coming up with ‘Brilliant Bob’ for a photo caption. A flick through the relevant magazine reveals the phrase “the brilliant Bob Wollek” — note the lower case first ‘b’ — in his



BOB WOLLEK CV HIGHLIGHTS

Daytona 24 Hours

1983	1st	Henn's Swap Shop Racing Porsche 935L	with AJ Foyt/Claude Ballot-Lena/Preston Henn
1985	1st	Henn's Swap Shop Racing Porsche 962	AJ Foyt/Thierry Boutsen/Al Unser Sr
1989	1st	BF Goodrich/Busby Racing Porsche 962	Derek Bell/John Andretti
1991	1st	Joest Racing Porsche 962	Henri Pescarolo/Frank Jelinski/John Winter/Hurley Haywood

Sebring 12 Hours

1985	1st	Henn's Swap Shop Racing Porsche 962	AJ Foyt
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Le Mans 24 Hours podiums

1978	2nd	Factory Porsche 936	Jacky Ickx/Jurgen Barth
1989	3rd	Factory-backed Joest Racing Porsche 962C	Hans Stuck
1991	3rd	TWR Jaguar XJR-12LM	Teo Fabi/Kenny Acheson
1995	2nd	Courage Competition Courage-Porsche C34	Mario Andretti/Eric Helary
1996	2nd	Factory Porsche 911 GT1	Hans Stuck/Thierry Boutsen
1998	2nd	Factory Porsche 911 GT1-98	Jorg Muller/Uwe Alzen

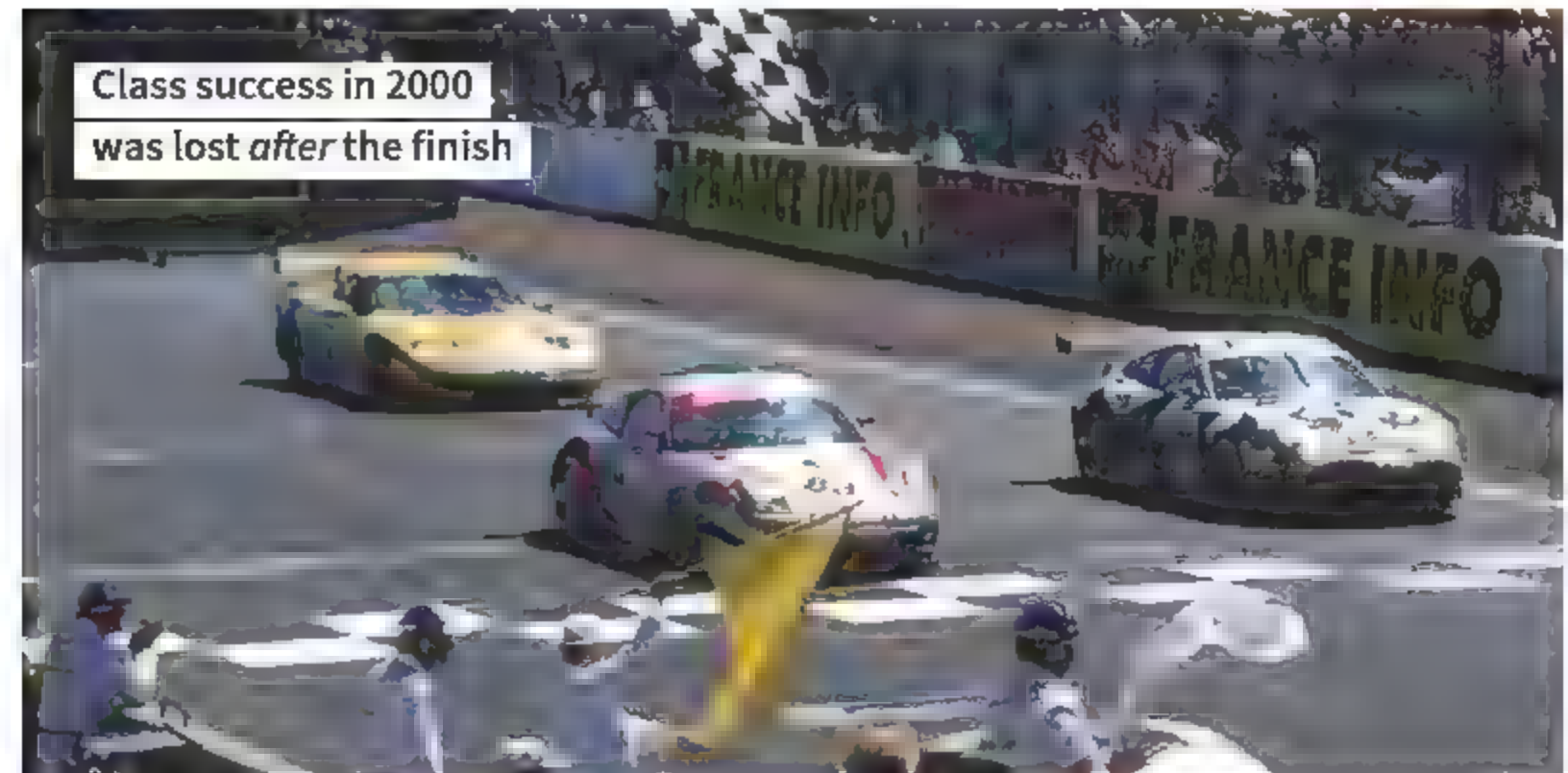




Fourth Le Mans class win and another overall runner-up spot came with the 911 GT1 in 1996



Wollek's final chance for a Le Mans win came in 1998 and yielded second



Class success in 2000 was lost after the finish

copy but not the caption he remembers. That suggests there might have been an earlier usage in Autosport or elsewhere.

Wollek maintained his brilliance into his dotage. You'll find a line of drivers to tell you that they could never match the pace in the slow corners of a team-mate perhaps as much as 30 years their senior.

"We were doing a test at Jerez with the GT1 car at the beginning of 1997 when Porsche was trying to figure out what to do with me," recalls Allan McNish. "I was quick, but I couldn't match the fastest guy on the day at the hairpin at the end of the back straight. That guy was Bob, who was older than I am now."

"He had this ability to let the car float around a hairpin and reproduce it lap after lap. He could take a tenth out of me every time. In the end I gave up trying to figure it out and had to brave it out in the fast stuff to gain back the time."

Johnny Mowlem was Wollek's final team-mate: they were meant to contest the full American Le Mans Series in 2001 at the wheel of a Petersen/White Lightning Porsche 911 GT3-R. Their only race together before Wollek was knocked off his bike the day before round two at Sebring came at the Texas Motor Speedway series opener. Mowlem, who was starting his second full season in the ALMS, was surprised to find that his veteran team-mate could match his times around the 'roval'.

"I was 32 and he was 57, and he was exactly the same speed as me," recalls Mowlem. "He was one or two tenths faster in the slow-speed corners, and there were a lot of them at Texas. I mentioned this to Sascha Maassen [who'd driven with Wollek at the Dick Barbour Racing Porsche team the previous season], and he said, 'Yeah, get used to it.'"

The length of Wollek's career appears preposterous today, and was even by the standards of the day. Most remarkable was his record at Le Mans beyond the age of 50. He was second three times, first in 1995 with Courage Competition and then with the Porsche factory in 1996 and 1998 with the first 911 GT1 and the carbon-chassis 911 GT1-98. He could have won any of those races, and perhaps in 1997 as well, though that year his own mistake put the GT1 Evo he was driving out of the race.

A lot of hard graft was put in by Wollek to ensure he stayed at the top of his game. McNish found out about his famed fitness during a test at the Hungaroring in the summer of 1997. "It was stinking hot and Bob would peel himself out the seat and be able to get back in," he recalls. "We youngsters had to be dragged out and then resuscitated. Bob had an amazing resilience."

Wollek took up cycling seriously in the late 1980s when the legacy

of a skiing injury stopped him from playing football, previously his preferred means of staying fit. His training regime is known to have taken in Tour de France stages, and each June he would cycle from his home in Strasbourg to Le Mans, claiming that he carried nothing more than his cycling gear, a credit card and mobile phone. It was his way of clearing his head before sportscar racing's big one.

Singer recounts a story from near the end of Wollek's life. Porsche decided to send its contingent of factory drivers to the fitness camp run by Willi Dungl, the guru behind Niki Lauda's double-quick return to the race track after his fiery accident in the 1976 German Grand Prix. Wollek didn't want to go, insisting he was fit enough.

Porsche Motorsport boss Herbert Ampferer asked Singer to persuade his friend to attend. Wollek duly made the trip to the Austrian Alps. "I asked him afterwards how it went, and Bob said, 'You know, OK,'" recalls Singer. "Then one of the young drivers, I can't remember who, came into my office and told me that Bob was so fit that he broke one of Dungl's cycling machines!"

In the latter stages of his career, Wollek bought a kart and practised regularly at a track close to his home. "Bob realised that his reactions

"ONE OF THE YOUNG DRIVERS TOLD ME BOB WAS SO FIT THAT HE BROKE ONE OF THE CYCLING MACHINES!"

were slowing down," says Singer. "He wanted to work on them. He explained that everything happened very quickly in a go-kart, so driving one was a good way of staying sharp."

Wollek claimed to have not a single trophy from his racing career at home and told your writer that he wasn't fussed about not winning Le Mans. It wouldn't define him, he insisted in an interview at the end of 1999. The photographs of him crying as he stood on the second step of the podium with Muller and Uwe Alzen the previous year suggested he did care, and deeply so.

And as for not defining him, that's probably not correct either. His failure to win at the biggest race of his chosen discipline only adds to the mystique that surrounds Brilliant Bob Wollek. ❦

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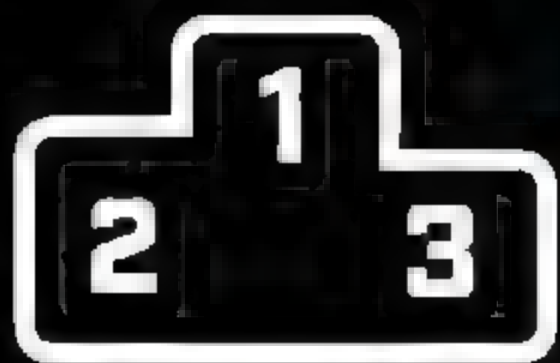


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Truex breaks his 2021 duck at 'jinx' track

NASCAR CUP
PHOENIX (USA)
14 MARCH
ROUND 5/36

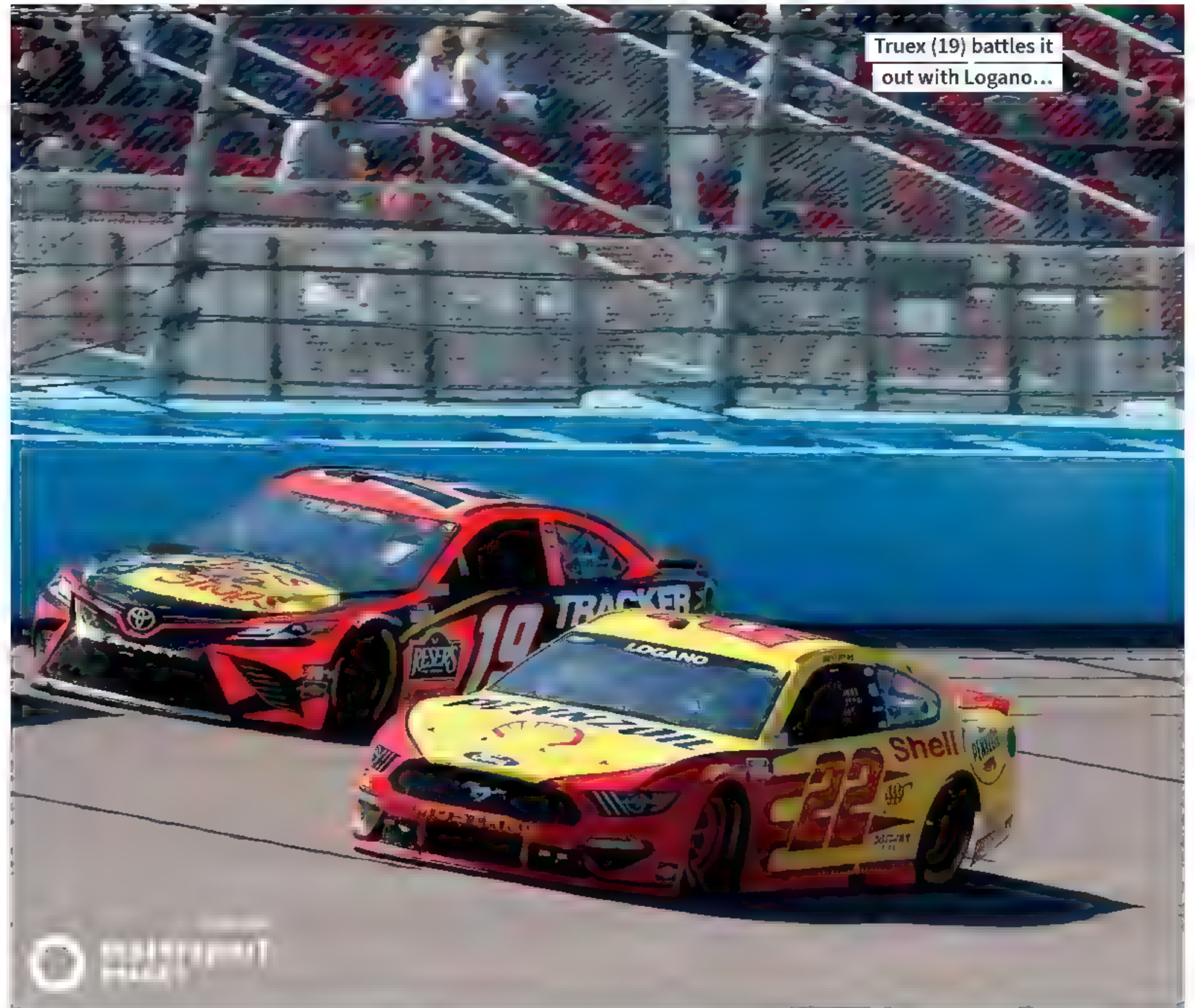
For a change, everything went right for Martin Truex Jr and his Joe Gibbs Racing Toyota team at a track on which he has typically struggled. Truex overcame an early-race run-in with the wall last Sunday at Phoenix Raceway and rallied back into contention for the win in the final stage.

Joey Logano was first off pitroad on the race's final round of pitstops but, on a restart with 25 of 312 laps remaining, Truex powered to the outside of Logano's Team Penske Ford and grabbed the lead through Turns 1 and 2. The race remained caution-free from there, and Truex held off Logano by 1.698 seconds at the finish for his first win of 2021 and first at Phoenix, which also hosts the series' championship decider in November.

The race also snapped Truex's 28-race winless streak. He becomes the fifth different winner in the series' first five races of the 2021 season.

"We made a few little mistakes," said Truex. "I hit the fence, obviously. We were way too tight at the start of the race. To be able to overcome that was good."

"Then you start having cautions towards the end. We weren't really good on the short run. It's like, 'Is this going to keep happening? Are we going to not get a long run to where we could get back to the lead?' It all just played out. It's one of those times when you feel like you've been in this position before and you've done everything



Truex (19) battles it out with Logano...

right and you didn't win. Now you're in the same position and you did."

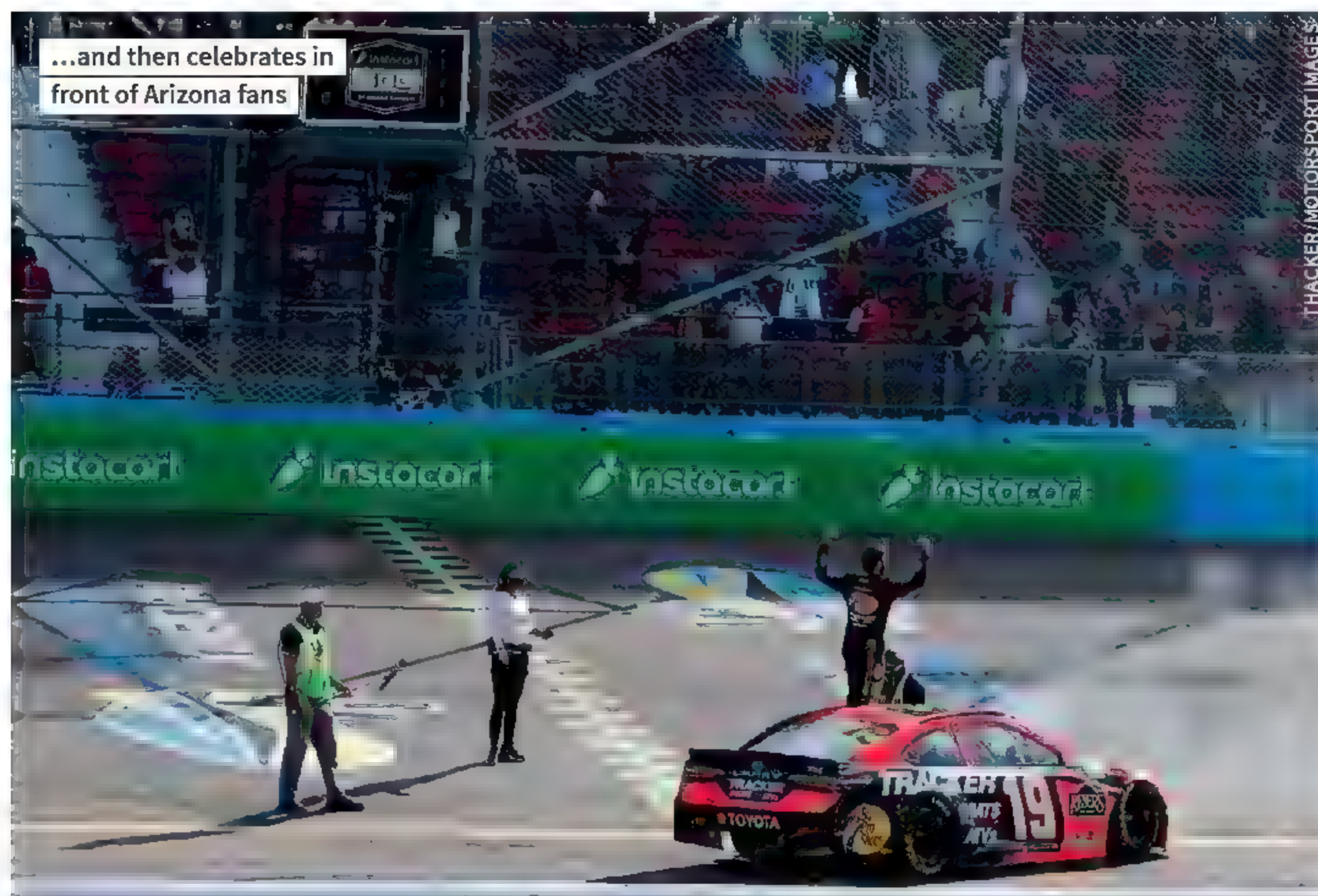
Truex's crew chief, James Small, added: "We had really strong races last year and just didn't execute. It's definitely a relief to get one this early. Now we can just concentrate on refining what we do every week, try to get more wins, more bonus points. That's ultimately in the playoffs where we struggled [in 2020]."

Brad Keselowski had fought for the lead with Logano during a short period of green-flag racing prior to the final caution, which was triggered when Kyle Busch spun

out at Turn 4. All the cars on the lead lap opted to make an additional pitstop, and from here Truex took up the reins by passing Logano after the restart.

Denny Hamlin was in contention for most of the race and finished third in his Gibbs Toyota, with the Penske Ford of Keselowski in fourth and reigning Cup champion Chase Elliott rounding out the top five in his Hendrick Motorsports Chevrolet. Kevin Harvick was next up from Kyle Larson, William Byron, Christopher Bell and Ryan Blaney.

JIM UTTER



...and then celebrates in front of Arizona fans

WEEKEND WINNERS

NASCAR CUP
PHOENIX (USA)
 Martin Truex Jr
 Joe Gibbs Racing (Toyota Camry)

AUSTRALIAN S5000
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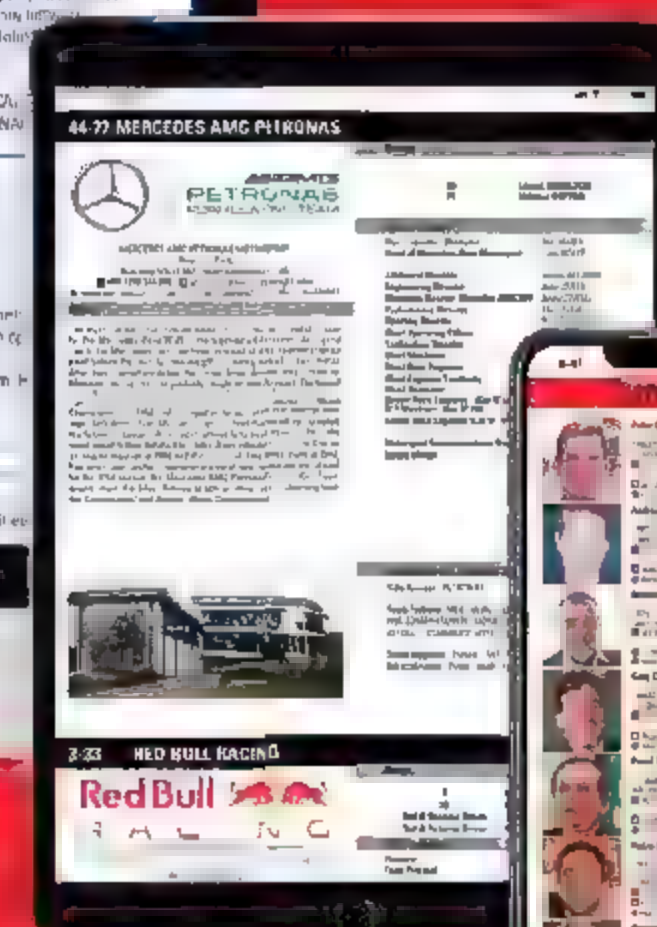
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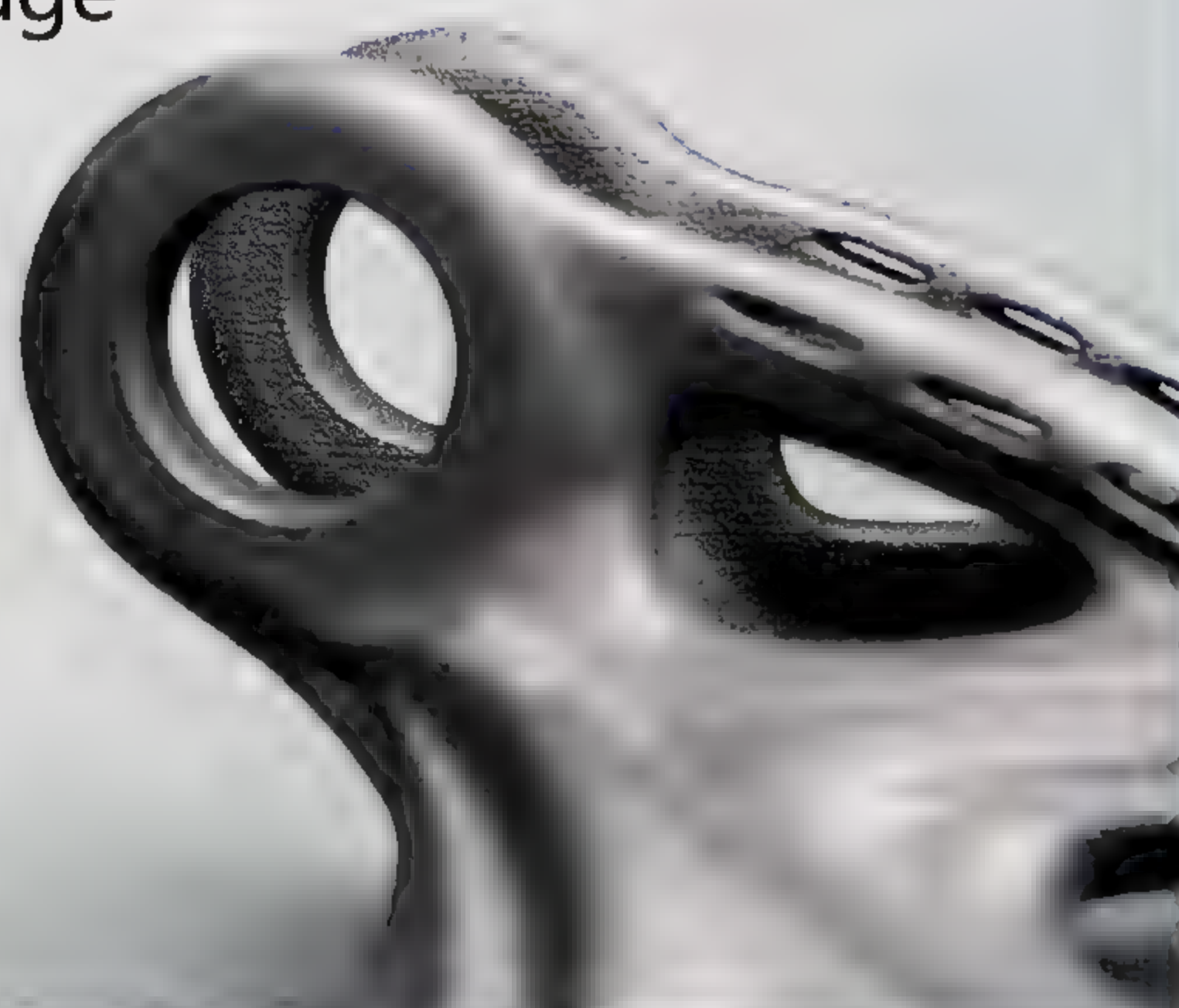
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DOUBLE CHAMP CAMMISH BACK TO CARRERA CUP

PORSCHE CARRERA CUP GB

Two-time Porsche Carrera Cup GB champion Dan Cammish will make a return to the series this year with leading squad Redline Racing after losing his British Touring Car Championship drive with Team Dynamics.

It was announced earlier this month that Cammish, who has raced for Dynamics since leaving Porsche competition at the end of 2017 and has fought for the BTCC title for the past two years, would no longer be driving for the Honda squad.

With Cammish unable to find an alternative BTCC drive, he said it was a natural choice to return to the Carrera Cup, which he dominated between 2015 and 2017 with Redline, winning two titles and narrowly missing out in 2017.

"Sometimes things happen for a reason," said Cammish. "It's disappointing but I've been around motor racing long enough to know these things happen."

"Strangely, just after I got the phone call from James Rodgers [Dynamics team manager] to say 'maybe you won't be in the team unless we can find a solution', Simon Leonard [Redline boss] rang me just to catch up and I said, 'I've got a bit of bad news and it's not looking good'. He said, 'I'm sorry, but if I can get you back in the team, I would be made up'. From that

moment, Simon has been working to get me in the team and I'm very grateful to have someone like Simon, who has supported me so much."

Cammish had continued to act as a driver coach for Redline after progressing to the BTCC, and his return to the grid sets up the mouthwatering prospect of battling fellow series dominator Harry King.

"I've read comparisons between me and him as we've both had very good starts to our Porsche racing careers, and that will be an interesting dynamic," said Cammish. "The question is how fast can I get back on top of it. I've been three years driving something that's front-wheel drive and front-engined and a completely different bit of kit. Hopefully I can get my head around it but there's no doubt Harry will start as favourite. But if I can go in there and pick up where I left off, I would be happy."

Cammish is also weighing up a return to the Porsche Supercup, in which he finished fourth in the 2017 standings. He has ruled out a full campaign but intends to make a couple of appearances.

"I had a great offer to go back to Supercup this year but I've just been put off by COVID," said Cammish, who added he was wary of having to find the extra budget for the series. "I would like to do the British GP round and maybe one or two others."

STEPHEN LICKORISH



Zelos's fresh bid for Mini crown

MINI CHALLENGE

Mini Challenge runner-up Dan Zelos is going to have another crack at winning the title this season, remaining with Excelr8 Motorsport for a third year.

Former Renault UK Clio Cup racer Zelos moved to the Mini Challenge for 2019 and was immediately a frontrunner, finishing third in the standings. He went one better last year, taking the most podiums of any driver en route to second place.

Zelos is also Excelr8's British Touring Car development driver and is set to test one of the squad's Hyundais later this year. "After finishing third overall in 2019 and

second in 2020, there can only be one goal for 2021," he said. "I'm under no illusions. It's going to be an extremely tough field again, but I'm feeling confident and I'm ready for the challenge that lies ahead. I've definitely grown and improved over the past couple of seasons, beating three ex-BTCC drivers last year.

"I'm looking forward to getting more familiar with Excelr8's BTCC operation, building a relationship with everybody there, standing in the shadow of the race drivers, learning as much as I can from them and getting behind the wheel of the Hyundai – all hopefully in preparation for a touring car debut in 2022."



BRDC BRITISH F3

Former British Formula 4 runner-up Sebastian Alvarez is set to make his debut in the BRDC British F3 Championship this season with Hitech GP.

The Mexican was due to race in the category for the first time last year with Double R Racing, but the COVID-19 pandemic meant he never made a racing appearance.

Alvarez, who took five wins in F4 in 2019, will switch to Hitech after Double R opted not to race in the series this year. Hitech joined the British F3 grid last season and powered Kush

Maini to runner-up in the points.

"I'm excited to make the step up into British Formula 3 with Hitech," said Alvarez. "I cannot wait to get going after a year out. I'm looking forward to getting to know everyone in the team and working together to achieve great results. Hitech is a great team with lots of experience."

Alvarez will join Bart Horsten at Hitech after the Australian moved across from Lanar Racing, which closed its doors at the end of last season.

The first round of the 2021 British F3 season is due to be held at Brands Hatch on 22-23 May, with seven further events planned throughout the year.

VOISIN TO UNITED AUTOSPORTS FOR EUROPEAN GT4

GT4 EUROPEAN SERIES

Ginetta Junior title contender Bailey Voisin will graduate to the GT4 European Series this season, driving a McLaren for United Autosports.

The leading LMP2 squad is entering the GT4 championship for the first time this year after merging with regular McLaren squad HHC Motorsport, and will field two cars. Voisin (below), who narrowly missed out on the Ginetta crown and ended up third in the standings after a tricky finale, will partner McLaren GT driver Charlie Fagg, while the other car will be raced by Dean Macdonald and Gus Bowers, who have both driven GT4 McLarens in British GT.

Switzerland-based Voisin opted to race in the European category as it is easier for him to travel to the events, while being an "extremely competitive" series, and he enjoyed a test in the McLaren.

"There were several options on the table and I tested a few different GT4s and different cars," he said. "United Autosports have a long history in the sport – and not just in GTs. They've got so much experience in prototypes and won WEC and Le Mans last year. When we heard they were going to do European GT4, it was a once-in-a-lifetime opportunity to get in with them and be part of such a successful team.

"There's still a lot to learn, but I feel like I can adapt to the car quite quickly. Charlie's got a lot of experience in GT4 and a lot of success in that category. Hopefully he can help me in the right direction and we've got a strong pairing."

STEPHEN LICKORISH



Ex-Warwick Toleman F2 car to race again

GEOFF LEES TROPHY

The Toleman TG280 raced by Derek Warwick in the 1980 European Formula 2 Championship will return to racing at Silverstone in May, 39 years after its last known race.

Mark Harrison has rebuilt the BP-liveried car ready for the new Geoff Lees Trophy for 1980s single-seaters, and plans to race it during the Historic Sports Car Club's International Trophy meeting on the Silverstone Grand Prix circuit on 22-23 May.

Chassis TG280-02 took Warwick to second in the championship as team-mate Brian Henton won the 1980 F2 title. At the end of the season, the Toleman team graduated to Formula 1 and the TG280s were sold, with Warwick's going to an Austrian privateer. After a season or

two of Formula 2, it was sold to Hungary where it was used in hillclimbs.

"It then spent most of its life in Eastern Europe," said Harrison. "It had quite a hard life on the other side of the Iron Curtain. The Hart engine it ran in period was not a stressed member of the chassis and in Eastern Europe it ended up with a BMW engine, which does work as a stressed member. So quite a bit was changed. It came back to the UK in around 2007 as a rolling chassis and then had a Rover

V8 engine installed."

Harrison owned two other TG280s at one point and offered advice for the rebuild. "I ended up buying it in 2013 and did nothing with it for a while," he added. "We finally stripped it down and set about rebuilding it. I don't think it has raced since the end of 1982. We got it finished in time for Derek Warwick to drive it at Silverstone for a magazine feature in September. The car is absolutely as it should be now."

PAUL LAWRENCE



Warwick raced chassis
TG280-02 in 1980

National FF1600 to boost the David Leslie Trophy

FF1600

Leading Scottish Formula Ford 1600 figures believe this year's David Leslie Trophy meeting can boost their championship's future, following the announcement that the British Racing & Sports Car Club's National FF1600 Championship will join the event.

After having to postpone its planned opening round at Snetterton in April, the National season will now begin at Donington Park on 8-9 May, before heading north of the border to Knockhill in June.

It will join the Scottish FF1600 grid's delayed first round



Logan Hannah won 2020
David Leslie Trophy

for the two-day meeting, meaning that a bumper grid is expected to contest the coveted David Leslie Trophy.

It will be the first time the National championship has raced at Knockhill since 2018, and the first on the conventional

clockwise layout since 2017.

"I think the David Leslie Trophy will be buoyed by the National boys coming up," said team owner Graham Brunton. "It'll be great for the club and for our drivers to pitch themselves against the

best in the country.

"Our championship doesn't race at a lot of different circuits and we've struggled for grid numbers recently, so it will be a good challenge for the Scottish drivers to see where they stack up against the top-level FF1600 guys."

Scottish FF1600 veteran Neil Broome is hopeful that the David Leslie Trophy weekend will be the catalyst to a longer-term National return to the Fife circuit.

"It's a really positive step," said Broome. "Hopefully, this can make Knockhill a regular spot on the National calendar."

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Kent brothers to team up in Touring Car Trophy for 2021

TOURING CAR TROPHY

Lewis Kent, winner of the TCR UK category within last year's Touring Car Trophy, will return to bid for another title in 2021.

Kent had targeted a graduation to TCR Europe, after contesting one-off rounds at Spa and Paul Ricard over the past two seasons, but the global pandemic and complications around Brexit have put those plans on hold.

Kent will switch from his previous Hyundai i30 N TCR to the machine that Engstler Motorsport's Nicky Catsburg took to a race win in the World Touring Car Cup at the Slovakia Ring last year. The 21-year-old will be joined in the family-run Essex and Kent Motorsport squad by younger brother Bradley in an ex-Luca

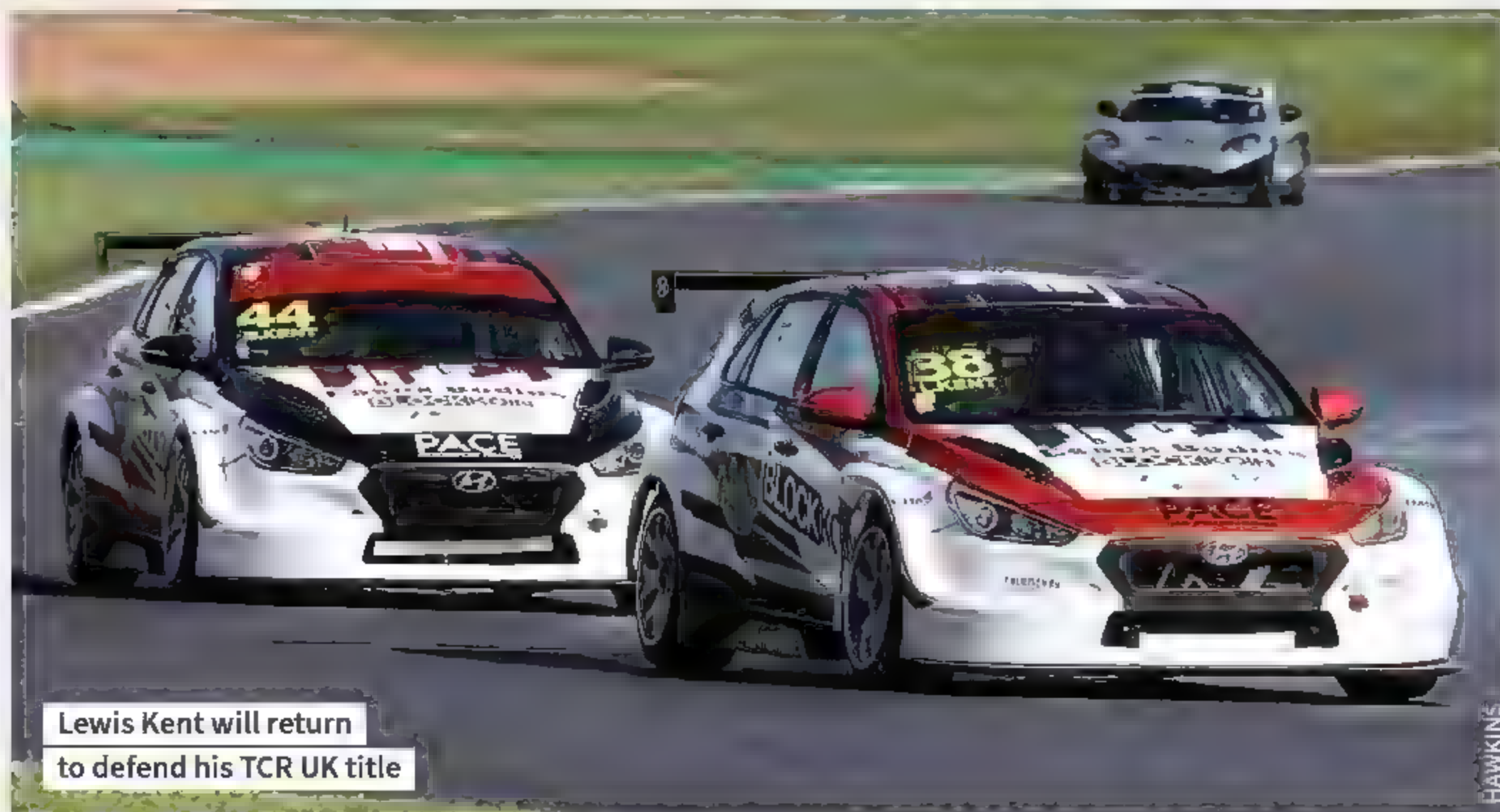
Engstler sister car. Kent Jr was runner-up in the Volkswagen Racing Cup last year.

"There's not a lot of difference between the new cars and the old car," said the elder Kent, who may still contest TCR Europe rounds at Zandvoort and Spa this summer. "The difference is we've got Brad in a car as well now. I reckon it won't be long until we see him at the front."

Kent's earlier car is available for sale or for a third driver to run with the team.

Another name confirmed for this year's TCT is Jac Constable. The one-time Ginetta GT4 Supercup Am-class champion will act as Power Maxed Racing's British Touring Car Championship development driver, and pilot the team's Cupra TCR in the TCT.

MARK PAULSON



New members join Team UK scheme

MOTORSPORT UK

Motorsport UK has announced five new drivers and co-drivers for its Team UK initiative for this season, while a new Podium Programme has been created to assist graduates.

Team UK is designed to help support young drivers who have been highlighted as potential future stars of the sport. Its members receive bespoke one-to-one support and advice to help them progress their careers.

Former McLaren Autosport BRDC Award winner Tom Gamble, British GT champion Sandy Mitchell, Porsche Carrera Cup GB title winner Harry King, and co-drivers Keaton Williams and Phil Hall have joined Team UK for 2021, while Formula E reserve driver Jake Hughes and 2019 European Rally champion Chris Ingram

are the first members of the Podium scheme.

"Due to a disrupted 2020 season, the Motorsport UK Academy cohort couldn't benefit from a full programme delivery," said Motorsport UK competitors pathway manager Katie Baldwin.

"The Academy team felt that it was only fair that we retained many of last year's athletes for another year. Whilst we tried to do as much as possible virtually, we're really looking forward to seeing our drivers in person later this year and delivering exciting and informative sessions with our supporting partners."

Motorsport UK has also renamed the next level of its Academy, with its Squad becoming Team UK Futures to better reflect its purpose of helping to prepare prospective Team UK members over a two-year period.

IN THE HEADLINES

PLOWMAN/FLETCHER MOVEUP

JRM's Bentley Continental GT3 will return to the British GT Championship this season with Martin Plowman and Kelvin Fletcher. The 2019 GT4 Pro-Am champions were due to graduate to GT3 last year, but deferred their entry due to the COVID-19 pandemic as sponsors would not be able to attend race meetings. A team statement said that a second car "isn't out of the question at this stage".

TWIGGER PASSES AWAY

Former MG Cup racer Chris Twigger passed away last week, after suffering from motor neurone disease. He had built up his own Rover Tomcat at Redhill Garage and joined the MG Cup in 2018, but was forced to hang up his helmet after a couple of outings in 2019. Daughter Kayleigh took the reins and raced the family Rover successfully last season. As well as circuit racing, Chris worked with the Beechdale Saab Rally Team in 1997, running the likes of Per Eklund and Kjell Olofsson. Kayleigh will continue to race in support of MND charities.

SUPERKART OPENER DELAYED

The British Superkart Championship season is now due to commence at Mallory Park on 22 May, after the April Cadwell Park opener was postponed. With a track limit at Mallory of only 36 karts, there could be a problem. A solution put forward is to have A, B and C groups racing against each other, thereby allowing 54 entries. It is unclear how many drivers have registered, but several high-profile drivers are not happy with the 2021 format and may not be competing.

MORE BRITISH F4 RECRUITS

Thai racer Tasanapol Inthraphuvasak (below) has completed Carlin's four-car line-up for British Formula 4 this year. He recently made his car racing debut in the UAE F4 series and finished fifth in the standings, taking three podiums. Meanwhile, Argenti Motorsport has signed Filipino karting graduate Eduardo Coseteng as its third driver.



July start for revised six-event 2021 BRC calendar

BRITISH RALLY CHAMPIONSHIP

The British Rally Championship has announced a revised six-event calendar for 2021, with the opening event now set to take place in July.

Amid continued lockdown measures and uncertainty surrounding the coronavirus pandemic, the loss of three original counters – Circuit of Ireland, Rally Tending and Clacton, and the Jim Clark Rally – forced organisers back to the drawing board.

The one-day Nicky Grist Stages Rally (10 July) in Builth Wells will now lift the curtain on the new campaign. It is one of four gravel rallies that remain from the original schedule, the other three being the Grampian Forest Stages (14 August), Trackrod Rally Yorkshire (24-25 September) and the Cambrian Rally (30 October).



Either side of the Cambrian is the closed-roads Mull Rally (8-9 October), which was originally a reserve event, and the Ulster (20 November), which makes a BRC return.

BRC championship manager Iain Campbell believes the new line-up resembles a “compact yet thrilling 2021 season offering a formidable mix of events”.

“It’s been an extremely tough time for all forms of motorsport over the past 12 months or so and the BRC has not escaped the challenges caused by the pandemic,”

he said. “But we have been working very hard behind the scenes to create a calendar worthy of the British Championship title, and I truly believe we have come up with an exciting, challenging yet cost-effective offering for our competitors.”

“I would like to thank all of the events in the calendar that have worked with us, and it goes without saying that we are all looking forward to finally getting the season under way in Builth Wells in July.”

JASON CRAIG

BTCC, BSB date changes have knock-on effect

CORONAVIRUS

There have been further tweaks to the club racing calendar after revisions to the British Touring Car Championship and British Superbike schedules.

The BTCC event at Brands Hatch has been pushed back from 12-13 June to 26-27 June, in a bid to allow more fans to attend, affecting the 750 Motor Club’s planned

Kent visit. The MG Car Club’s Snetterton trip has also been delayed by a week to 11-12 September after a BSB date change.

Meanwhile, the Classic Sports Car Club’s single-day July Thruxton event has moved following the circuit’s BSB round being postponed and there being limits on the number of race days the Hampshire venue can host in a calendar month.

Instead, the CSCC benefits from an extra day of action, racing on the 1-2 May weekend that was originally earmarked for Knockhill. The club has also rescheduled its March Snetterton fixture to 14-15 August.

“The upshot is positive for us,” said CSCC director David Smitheram. “We approached this year with a bit of caution and not booking too much track time because all of the

predictions were it was going to be doom and gloom this year for the economy. But the interest has been crazy so far, so it’s done us a big favour [the second Thruxton day].”

The club has sold out five of its six grids for its April Oulton Park opener, while all 46 spaces for its Brands Hatch Grand Prix Tin Tops event filled up in an hour and two minutes last week.

STEPHEN LICKORISH

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Celebrity appeal

Famous faces battling each other on track attracted the crowds in years gone by, so is it time to use such events again to build interest in UK motorsport?

RACHEL HARRIS-GARDINER

The cult of celebrity, however spurious, is everywhere in our society, on our TVs and social media feeds and even on traditional billboards. You'd think that motorsport would have renewed its complicated relationship with the glitterati by now, but no. The heights of household-name petrol-powered daredevilry were the 1970s.

The chief exponent of the celebrity race was former Brands Hatch director John Webb, who organised contests that pitted a host of notables against a few game pros and, from time to time, Webb's roster of aspiring female drivers. The first races were conducted using the track's fleet of school Escort Mexicos, later replaced by Escort Mk2s – which featured in a race at the 1976 British Grand Prix, where 16 non-Formula 1 drivers were voted for by Autosport readers – and then Talbot Sunbeams.

Radio 1 became involved and hosted its Fun Days at UK circuits from 1973. Celebrity races for “disc jockeys and pop stars” were held alongside races for Formula Ford, Renault 5s and Special Saloons at the first event at Brands. The biggest of these Fun Days happened in 1975, when 47,000 people descended on Mallory Park for a mix of motorsport and pop music. A number of teenage girls ended up in the famous Mallory lake in a bid to accost the Bay City Rollers.

It wasn't just the British national scene that embraced celebrity races. Perhaps the world's biggest such event was the Long Beach

translating into rising entry fees for drivers. There's some extra gate takings to be had from mainstream entertainment fans wanting to see Howard Donald shoving Katya from *Strictly Come Dancing* off-track before nipping past Jermaine Jenas for a win, but that's not the only way club motorsport can benefit.

New audiences mean not only new revenue opportunities, but also new faces who might well be willing to throw some cash around. Patrick Dempsey probably faced ridicule from the diehards when he first took to the tracks in 2004, but the actor has since gone on to found a successful sportscar team and provide race seats to many excellent drivers. Ditto Jackie Chan, whose early efforts in motorsport included promoting a Macau support race for female celebrities in Mitsubishi. The team that bears his name has now twice come close to winning Le Mans. Even Noel Edmonds, who got his break in the Radio 1 races of the 1970s, ploughed considerable amounts of his own cash into a Le Mans team in 1997, run by David Price.

It continues. Chris Martin of Coldplay is one of the backers of VR Motorsport's winning Pragas in Britcar. Motorsport needs buckets of money, and if that means getting friendly with the big spenders of the entertainment world, then so be it.

Naturally, shoehorning a celebrity one-make challenge into any old meeting isn't going to do much without any further relevance. Historic racing is a natural bedfellow of our current TV fascination with nostalgia and all things vintage. Why not produce a car-themed episode of *The Repair Shop* or any of the many auction-based shows currently earning big viewing figures? And what more logical way to link up on track than with a race for relevant faces? The Silverstone Classic has made this work in recent years by putting celebrities in Austin A35s. The cars have become popular on the historic scene, and the chance to drive one has attracted not only the usual suspects like Donald and Steve Parrish, but Olympic cyclist Jason Kenny and boxer Carl Froch.

The eco-credentials of a nascent EV racing scene could open motorsport up to previously sceptical or even hostile audiences, and who better to win them over than some green-minded celebs?

It works the other way, too. Motorsport people, with a few exceptions, have been reluctant to play the celebrity card in the UK. Racing drivers seem remote and do not appear on *Dancing on Ice*. Yet why not take the career-boosting route opened up by aged-out kids' TV presenters and unfashionable pop stars?

Purists will turn up their noses, but they're not the ones who need convincing that race meetings are worth a visit. If a well-known TV face can stir up enthusiasm among the public for subjects as abstruse as astrophysics, like Professor Brian Cox, or the hitherto niche sport of diving, like Tom Daley, then why not the straightforward joy of motor racing? ❧

“The team that bears Jackie Chan's name has twice come close to winning Le Mans”

Toyota Pro-Am Celebrity race, held between 1977 and 2016. It was televised and attracted huge names from Hollywood, professional sport and music, as well as motorsport stars from the US and abroad.

Grand prix race weekends haven't been above this sort of thing. The Alfa Romeo 164 Celebrity Challenge followed the European F1 circuit in 1988 and was one of the lesser-known brainchildren of Bernie Ecclestone, then still at Brabham. The British round was won by the largely forgotten ‘Bungalow’ Bill Wiggins, a property developer whose fame was mainly derived from dating Joan Collins.

I'm probably shouting from the wrong soapbox here. The sort of diehard fans who watch national racing tend to be proud of their non-interest in showbiz, and that's fair enough, but we can't deny that casual audiences for motorsport below the level of the BTCC aren't brilliant, and one upshot of this is lower circuit revenue,



AN INSPIRATION, LIVING LIFE ON



DOCUMENTARY REVIEW ALEX ZANARDI: "DISABILITY IS ALL RELATIVE"

Alex Zanardi has a straightforward ethos, and it goes like this: 'every single person has a disability – humans can't fly, so the plane was invented – but it's all relative and so it can be overcome'.

Following the Italian's crash at the Lausitzring in 2001, when his heart stopped seven times and he would require the amputation of both legs above the knee, he's used that remarkable approach to race handbikes and hand-operated cars to not only recover, but to win. As he wryly quips, "having important goals is just a good excuse to do something I really like".

The two-time CART champion is as inspirational as they come, and a watch of the 52-minute *Alex Zanardi: "Disability is all relative"* does nothing to diminish the awe that surrounds his achievements. Available to view on Amazon Prime, the one-off documentary follows his eight-month preparation as he builds up to his Daytona 24 Hours debut in 2019.

Zanardi returned to motorsport to do battle in the European Touring Car Championship, but between 2003 and 2018 he raced with his prosthetic legs. This meant that when he braked with a conventional pedal, he was putting immense stress through his hips.

This documentary tracks Zanardi and BMW as they work to develop a new hand-control set-up to use in the M8 GTE in time for his US endurance racing bow. A ring behind the steering wheel is employed to control throttle application, while what looks like a hydraulic handbrake has been repurposed to be used for braking,

and with a button to control downshifts.

After a test of the system by Daytona team-mate Jesse Krohn, who can operate the conventional brake in the event of a failure, Zanardi receives his surprise call-up to make a guest appearance in the DTM in 2018. Again, Zanardi offers an excellent couple of soundbites ahead of his two night races at Misano aboard the M4 Turbo machine. Aged 51, he describes his German tin-top cameo as filling his "best memories book" that was "missing this picture". When he backs up his 13th place in the opener with a strong fifth in the second rain-hit race, he's as "happy as a pig in shit".

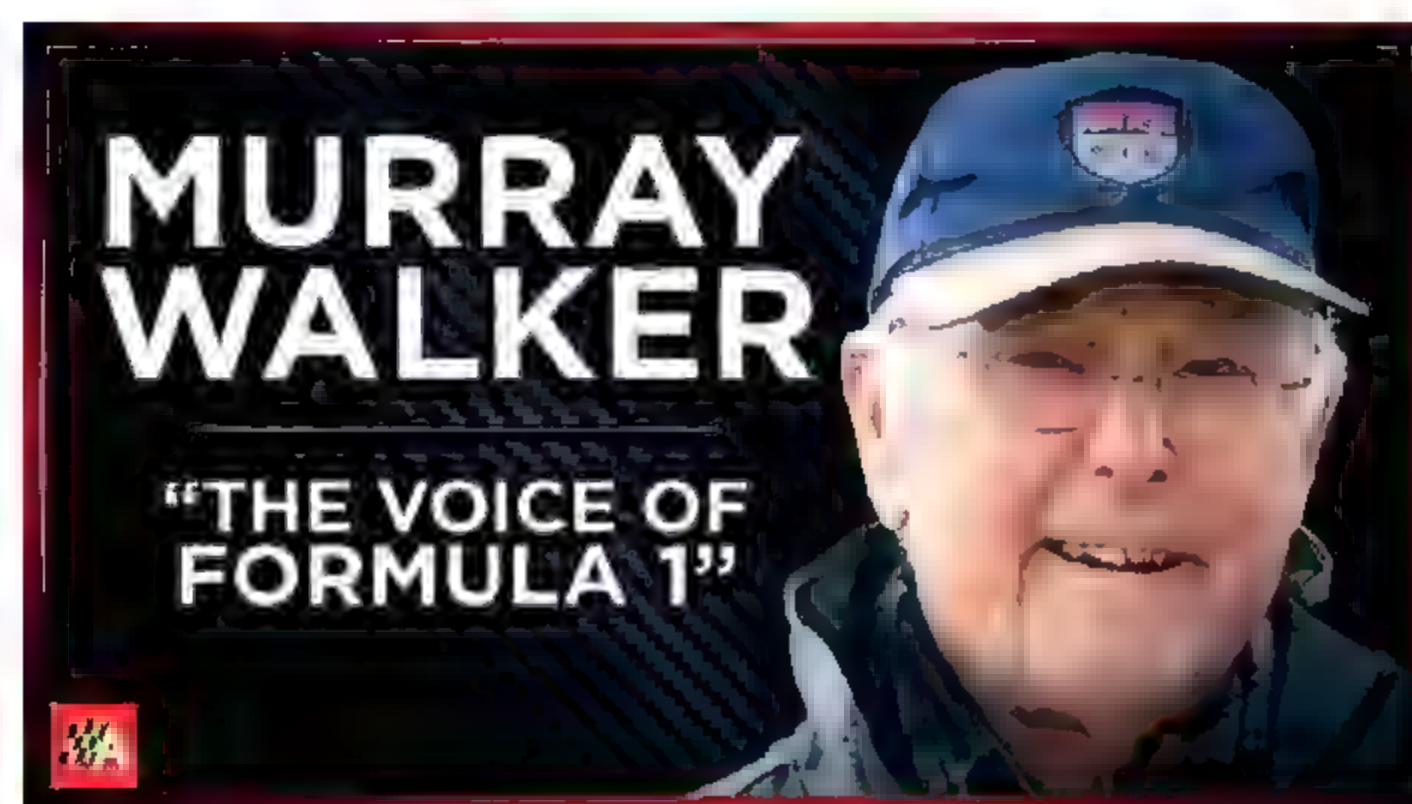
The documentary is narrated by ex-Formula 1 commentator Jonathan Legard. While the script he has to work with is clearly aimed at a non-motorsport audience, Legard's voice is one of real gravitas and is a fine match for the images on screen.

Preparation for Daytona comes into full focus, as Zanardi perfects the driver-change pitstop procedure ahead of his six hours and three stints behind the wheel. Although the DTM races act as a solid 'real-world' test for the new hand controls, 'perfect' timing stymies the #24 car's race in Florida. At the precise moment when Zanardi connects his adapted steering wheel, the pit crew drops the car off its jacks and the impact damages the pins in the steering column. Although a spare steering wheel is fitted, the car still struggles to fire and eventually needs time in the garage to be repaired.

Combined with a deluge that massively truncates track time through a series of red flags, coverage of the race in this documentary is limited and arguably isn't the fitting final chapter to this story that it could have been. Footage of Zanardi in the hot seat is limited for the credits. Otherwise, however, this is an exercise in stellar cinematography meeting with an atmospheric



youtube.com/AUTOSPORTdotcom



Following the sad news of the death of Murray Walker last weekend, his former television colleague James Allen pays a personal tribute to the man known simply as 'the voice of Formula 1'. Allen explains why Walker was universally respected by his audiences and by the teams and drivers he commentated on, too.

Go to bit.ly/MurrayWalker

HIS OWN TERMS



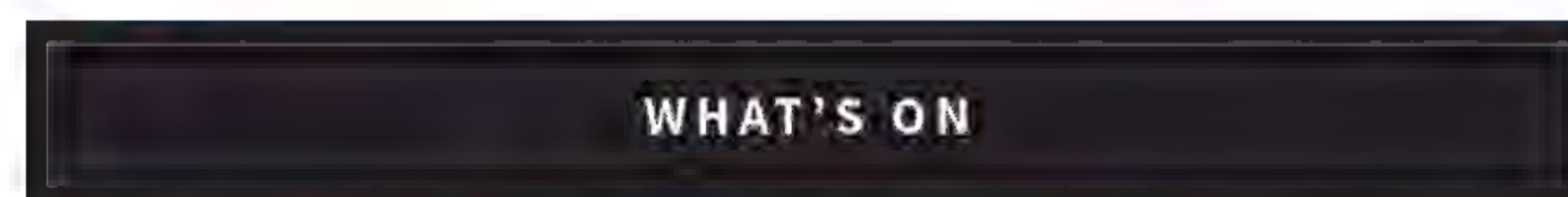
soundtrack and slick editing.

As the focus shifts to celebrating the GTLM class win of fellow Team RLL line-up Augusto Farfus, Philipp Eng, Colton Herta and Connor De Phillippi, the documentary edges closer to being an extended BMW promo. But as you might expect, Zanardi takes events with good grace.

This watch of Alex Zanardi: "Disability is all relative" and the writing of this review comes after Zanardi's hand-bike crash in Italy last year, which left him in a severe condition. Since then, he's speaking again.

Likely, the timing of the incident is why you'll be hard-pressed to find any promotion around the documentary, as sensitivity was the order of the time. But Legard's line, which rounds out the 52 minutes, is still completely relevant. "Let's appreciate the man who no matter what happens, lives life on his terms and follows his own path." A watch of this documentary is part of that appreciation.

MATT KEW



INTERNATIONAL MOTORSPORT

Sebring 12 Hours

IMSA SportsCar

Round 2/13

Sebring, USA

20 March

NASCAR Cup

Round 6/36

Atlanta, USA

21 March

TV Live Premier

Sports 2, Sun 1830

NASCAR Xfinity

Round 6/33

Atlanta, USA

20 March



NASCAR Truck

Round 4/22

Atlanta, USA

20 March

20-21 March

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Sandown, Australia

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INTRODUCING



You could be forgiven for not knowing the name Jonny Edgar, but the 17-year-old Red Bull Junior is arguably one of Britain's brightest prospects on the long road to Formula 1.

Edgar may have flown under the radar of many because his fledgling car racing has to date been based outside the UK at the behest of his Austrian backers. The Cumbrian made himself known in Europe by winning last year's ADAC Formula 4 Championship in Germany, recording six wins to pip fellow Red Bull Junior Jak Crawford by just two points.

A fourth-generation racer (grandad Terry, dad Justin and uncle Jason all won British karting titles), Edgar started competing aged eight and announced himself as a future star by winning the CIA/FIA OKJ European karting title in 2017, prompting contact from Red Bull.

Now that he's proven himself in F4, Edgar faces his biggest test yet in 2021 as

he embarks upon a rookie FIA F3 campaign with top British squad Carlin. The team is well proven in nurturing young talent, with new AlphaTauri signing Yuki Tsunoda its 27th F1 graduate. Edgar hopes to emulate Tsunoda's rapid rise from F4 to F1 in consecutive seasons, but is well aware of the challenges that lie ahead.

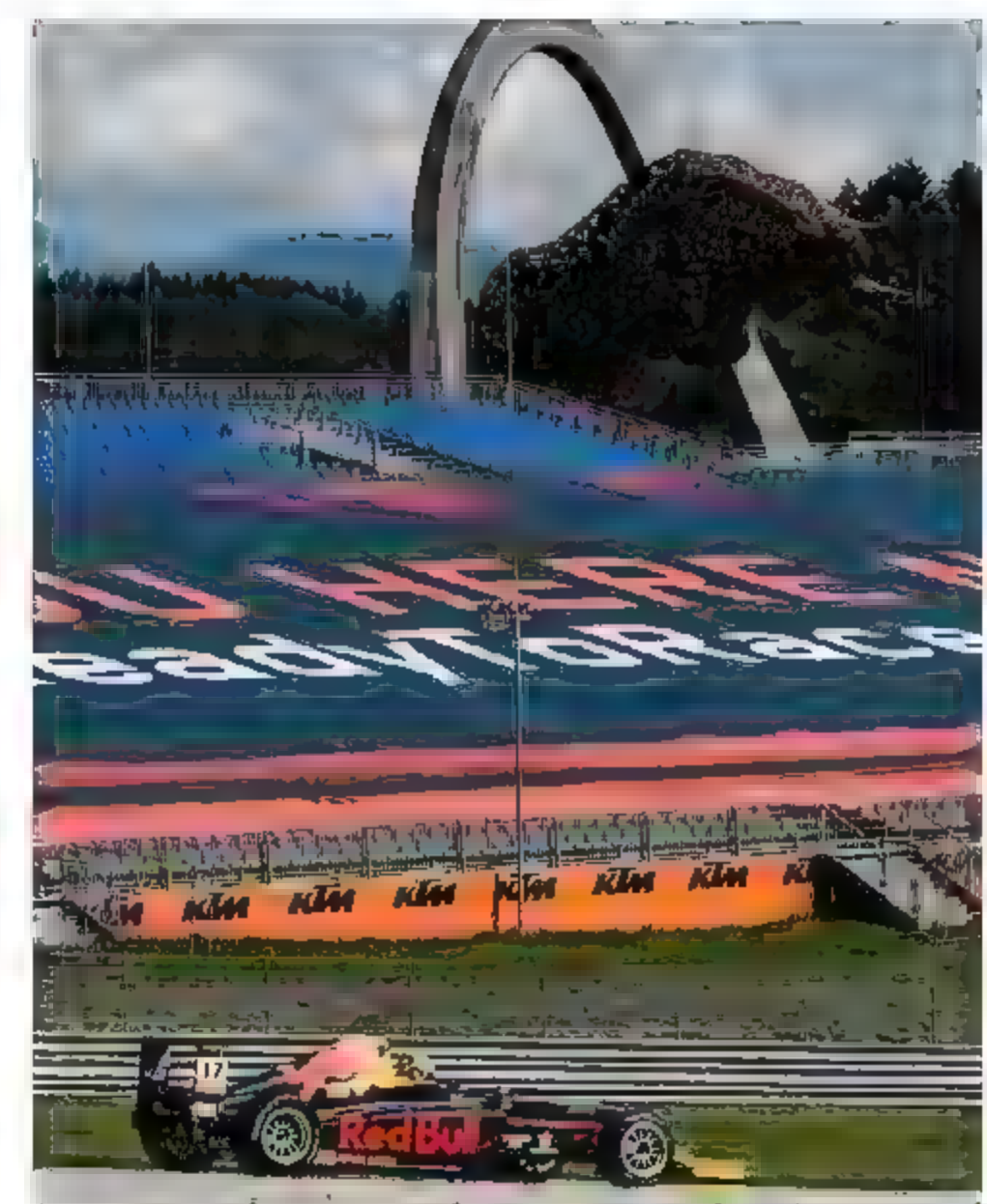
"It's really exciting to be racing on the F1 weekends and also in a faster car," he says. "It's great to be in such a good team. Obviously seeing what Yuki managed to do, hopefully I can do something similar in F3 and be as close to the front as possible."

"A lot of people have got to F1 from being on the Red Bull programme. It gives me a better chance. It's hard, but [Red Bull support] makes it a little easier."

A Brit is yet to go all the way through the Red Bull Junior programme to F1 – Anglo-Thai Alex Albon was dropped, but got back on the books with Toro Rosso in 2019 – so Edgar is making the most of his chance by preparing on the F1 team's simulator.

"I've been driving an F3 car and the model is pretty good, it feels pretty close," he adds. "There's also good data from drivers that have been on the simulator over the years. It's useful to compare to that and see where to improve. I'm pretty confident, but I need to see how testing goes. The main thing is to try to improve all the way through the year." ❄

**"SEEING WHAT YUKI
MANAGED TO DO,
HOPEFULLY I CAN DO
SOMETHING SIMILAR"**



CV

Age	17
2021	Racing in FIA Formula 3 with Carlin
2020	1st in ADAC Formula 4, 4th in Italian F4 Championship
2019	10th Italian F4 Championship
2017	Signed to Red Bull Junior programme, CIA/FIA OKJ European Champion



FROM THE ARCHIVE

Back to an era when the Formula 1 paddock was rather less like Fort Knox and majored in ramshackle charm – note how the Italian-registered transporter

doubles as chilled hang-out space.

Here at Silverstone for the 1973 British Grand Prix, a milling throng surveys the pre-race preparations of the BRM and Tecno teams (Jochen Mass's #31 Surtees

TS14A is also just visible, far right).

BRM's trio of P160Es were driven by Clay Regazzoni (#19), Jean-Pierre Beltoise (#20) and Niki Lauda (#21), while Tecno fielded a sole PA123 for Chris Amon.



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IN DEFENCE OF...

RED WILLIAMS LIVERIES

The blue, white and gold branding of Rothmans had become a motorsport staple of the 1980s and 1990s, as it assumed title sponsorship of Williams's Formula 1 team at its peak. It enjoyed four successful years in that role, culminating in back-to-back titles for Damon Hill and Jacques Villeneuve in 1996 and 1997.

Then, parent company Rothmans International made the decision to cede its famous colours and instead use the Williams team to promote its Australian brand Winfield. The Williams cars were stripped of the blue in which they had run since 1985 and turned out in a red, white and gold scheme for the 1998 season. It was deliciously sacrilegious, particularly given its similarity to Ferrari, a team it had bitterly battled against the previous year.

It's perhaps unfortunate that the switch to a red scheme coincided with a decline in fortunes for Williams. The loss of Adrian Newey had deprived Williams of its driving force on the technical team, while Renault's departure left it to field second-string Mecachrome engines. Villeneuve

duly slid to fifth in the standings in 1998.

Naturally, history doesn't look kindly on the red period at Williams. But taking out the context of a plunge in fortunes, and the car looking a bit too similar to the Ferrari at a distance, the 1998 FW20 looked great. It perhaps took some refining, and eventually the livery had some of the white patches whittled away to clean up the block of sponsors at the front, but the 1999 rendition was a wonderfully 1990s concoction — fitting before the transition to the new millennium. The gold and blue flashes, and the more sculpted white fill down the centre, produced a very cool car.

Perhaps it's just the nostalgia talking, given that the 1999 season was the first full season I watched, but the ugly ducklings of the Williams era should be celebrated as daring designs. Woody Woodpecker's avian mug on the nose only adds to the nostalgia factor and, although the following BMW-influenced liveries arguably looked cleaner, their corporate nature took away some of the soul.

JAKE BOXALL-LEGGE



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A photograph of a Formula 1 race. In the foreground, a person's arm and hand are visible, wearing a blue jacket, reaching out towards the track. In the background, a blue and yellow Formula 1 car is driving on the track. The car has 'Telefonica' and 'Castrol' logos. A checkered flag is visible in the background. The scene is set in a large stadium with many spectators. The sky is blue. The overall image has a slightly grainy, high-contrast quality.

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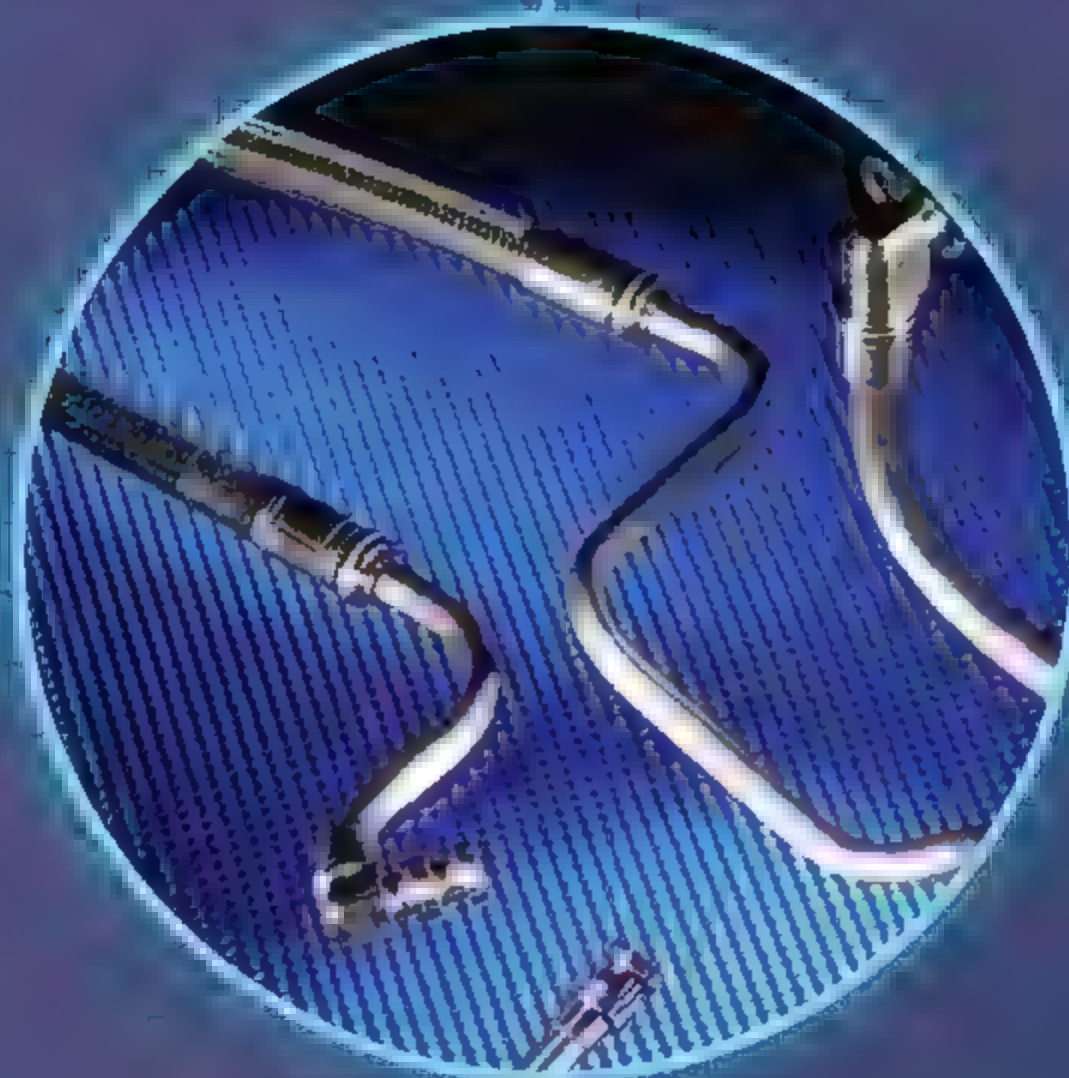
FROM RACE ENGINEER TO AERO GURU

How the late Dino Toso made his mark on Alonso's title heroics

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GIVING AN UNSUNG MOTORSPORT HERO HIS WELL-DESERVED DUES

Many of you reading this probably won't know the name of Dino Toso, who died in August 2008 four years after being diagnosed with lung cancer. But it's a mark of the respect with which he was held that when I was given Damon Hill's number by a colleague and optimistically fired over a text message, he called back almost immediately.

Hill was going through a difficult patch in his career when he worked with Toso at Jordan in the 1998 and 1999 seasons, but the 1996 world champion was only too happy to share his recollections of an engineer he recognised as having the potential to hit the very top in Formula 1.

It was that determination to have the greatest impact on the car that compelled Toso to effectively start again, joining Benetton (later Renault) to work in the aerodynamics department. The rest, as

we know, is history, the team winning two world championship doubles with Fernando Alonso in 2005 and 2006. Toso played a pivotal role while undergoing gruelling treatment. His colleagues recall a truly inspiring individual on page 12.

Today the Enstone team is in a very different position, in the throes of rebuilding for the umpteenth time in its latest guise as Alpine with new senior management figures and a driver no less keen to capture those glory days... Karel Loos is the man who will engineer team returnee Alonso, and as he tells Filip Cleeren (p18), he's eager to get going.

Like most motorsport fans, I'm already excited about the battles at Le Mans when LMDh cars come on stream in 2023. We hope General Motors will be there too, a question David Malsher-Lopez asked its new sportscar racing programme manager Laura Wontrop Klauser (p30).



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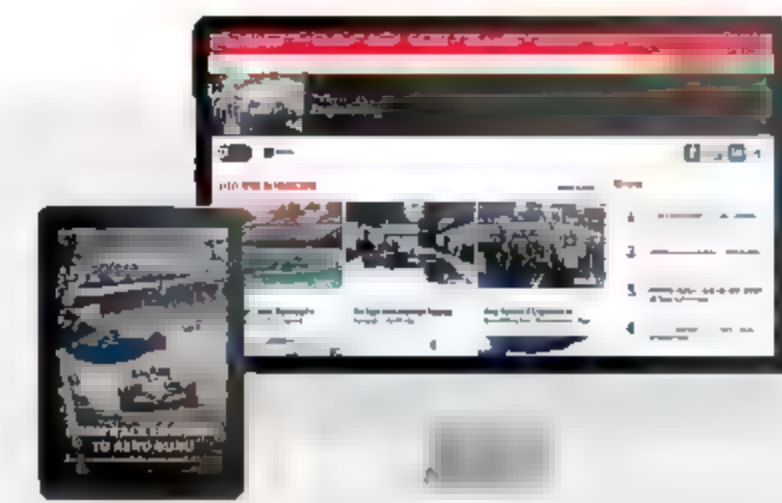
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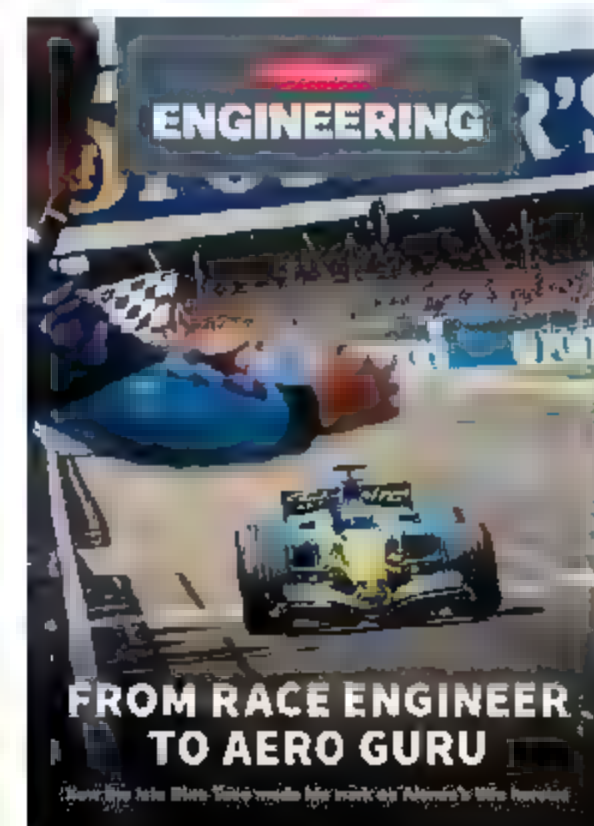
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Steve Farrell

From Group C to WRC via F1, Cicely's BTCC chief engineer gives career tips

FIA REVEALS GROSJEAN CRASH FINDINGS

Recommendations made on safety fuel bladder specification after fire

The FIA has outlined recommendations to improve safety measures in Formula 1 after concluding its investigation into Romain Grosjean's 2020 Bahrain Grand Prix crash. The Frenchman's Haas was torn in half upon impact with the barrier, which was penetrated by the survival cell. Grosjean was conscious throughout, and escaped from the flaming wreckage with only burns to his hands.

The FIA's report reveals that the fire started after "the fuel tank inspection hatch on the left-hand side of the chassis was dislodged and the engine fuel supply connection was torn from the fuel tank 'safety bladder'". This allowed fuel to escape and ignite. Much of the work the FIA said it will

complete after reviewing the accident is centred upon the safety fuel bladder specification. It plans to conduct a design review of safety fuel bladder installations, review regulations covering the design of safety fuel bladder connections and inspection hatches, and will also update the FIA Standard that covers safety fuel bladders.

The report said that Grosjean's personal safety equipment, "including helmet, HANS and safety harness as well as the survival cell, seat, headrest and Halo frontal cockpit protection performed according to their specifications", but said it will launch an "investigation into improvements to the gloves' Heat Transfer Index (HTI)".

The report also said there would be an ongoing research project relating to extinguisher systems on open-wheel cars, as well as ensuring that visor mechanisms on helmets remained operational after being exposed to fire.

FIA president Jean Todt said that "important learnings" had been drawn from the investigation.

"The enduring commitment of the FIA, particularly the Safety Department, on reducing risks associated with motorsport enabled Romain Grosjean to maintain consciousness and survive an accident of this magnitude," he said. "Safety is and will remain the FIA's top priority."

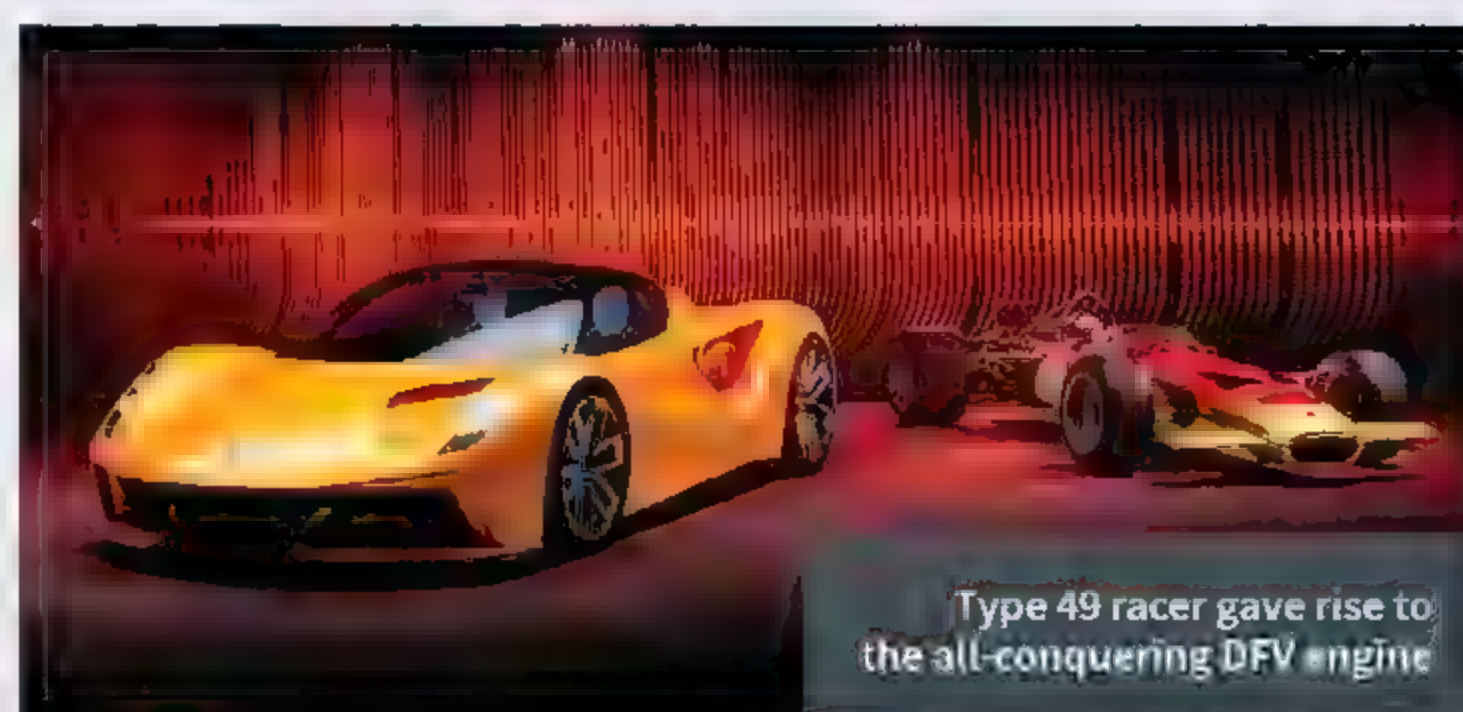
LUKE SMITH



NEW ELECTRIC LOTUS EVIJA HYPERCAR TO BASE SOUND ON TYPE 49 FORMULA 1 CAR

The sound of the Lotus Type 49 Formula 1 car that won 12 world championship grands prix and contributed to two world championship doubles will be used as the inspiration for the marque's new Evija hypercar.

The Cosworth DFV-powered 49, which helped to pioneer the engine as a stressed part of the monocoque, won on its F1 debut with Jim Clark in the 1967 Dutch Grand Prix at Zandvoort, and carried Graham Hill to the 1968 world championship title. It remained competitive into 1970, when Jochen Rindt continued its



100% Monaco Grand Prix record.

British music producer Patrick Patrikios is working with Lotus to develop the full range of sounds – including the seatbelt safety

alarm – made by the all-electric Evija, which is due to be released later this year. In devising the external noise, Patrikios set upon the note produced by the V8 DFV,

which he said "stirs something in your soul, just like the best songs", and slowed down the frequency. "We all wanted something to spark an emotional connection between car and driver," Patrikios said. "Sound is hugely influential when it comes to creating and forming emotions, to enrich that bond that's such a critical part of the Lotus experience."

"I love that the sound from one of the most iconic Lotus race cars of all time has been the inspiration for its newest [car]. There's a symmetry to it which is beautiful."

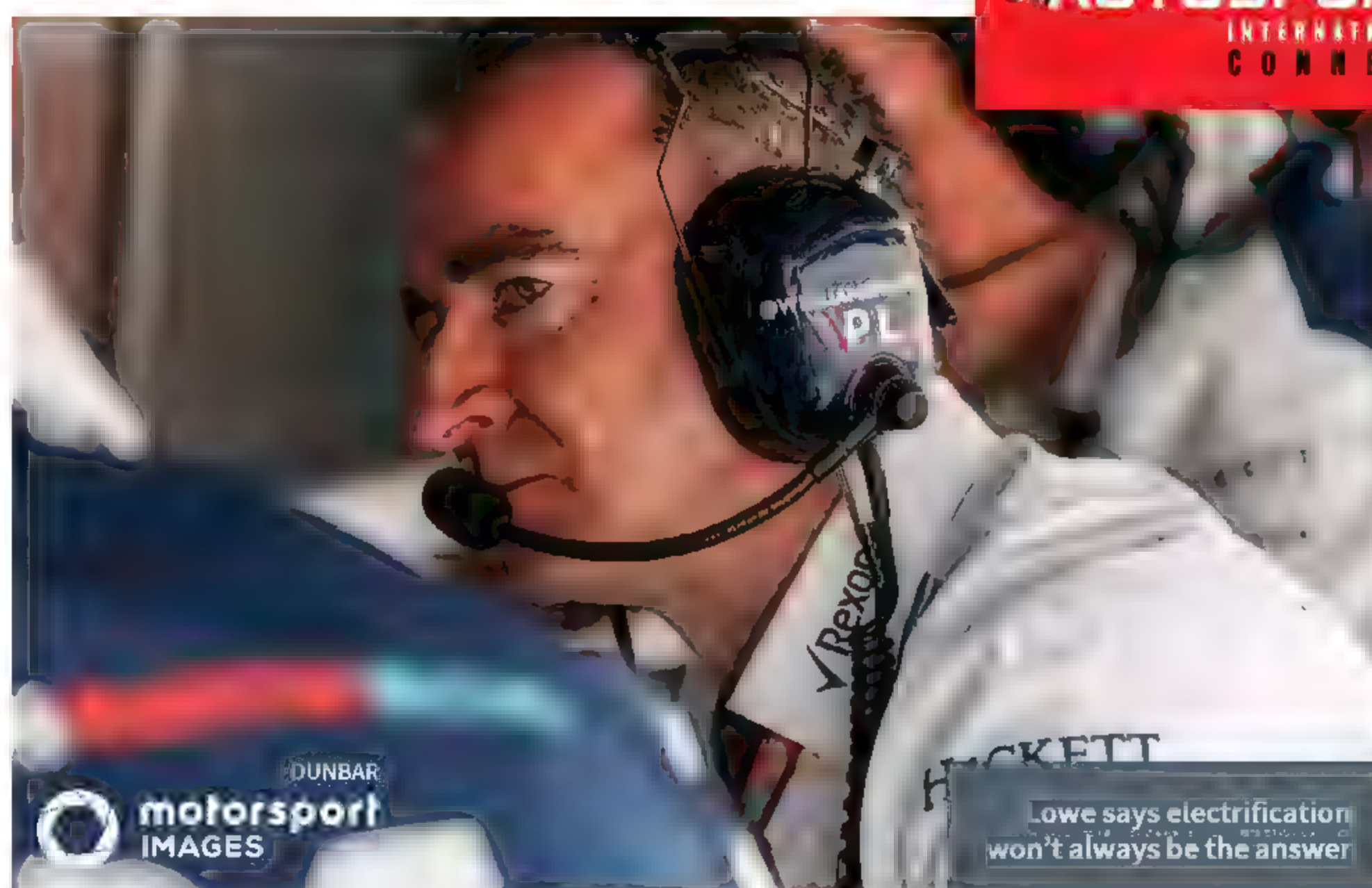
'ALL OF THE SOLUTIONS' FOR PROPULSION WILL BE NEEDED, SAYS EX-F1 ENGINEER LOWE

Paddy Lowe, the former technical boss of the McLaren, Mercedes and Williams Formula 1 teams, says "all of the solutions" mooted for the future of propulsion have value and that no options should be ruled out.

Lowe, who recently founded the Zero Petroleum company that plans to use sustainable methods to produce synthetic fuel, was speaking on a panel of experts in last week's Autosport International Connect session on Future Power.

He said that while E-fuels were "not intended to displace" electrification, it was needed as an alternative for planes and combine harvesters that would not be feasible to electrify.

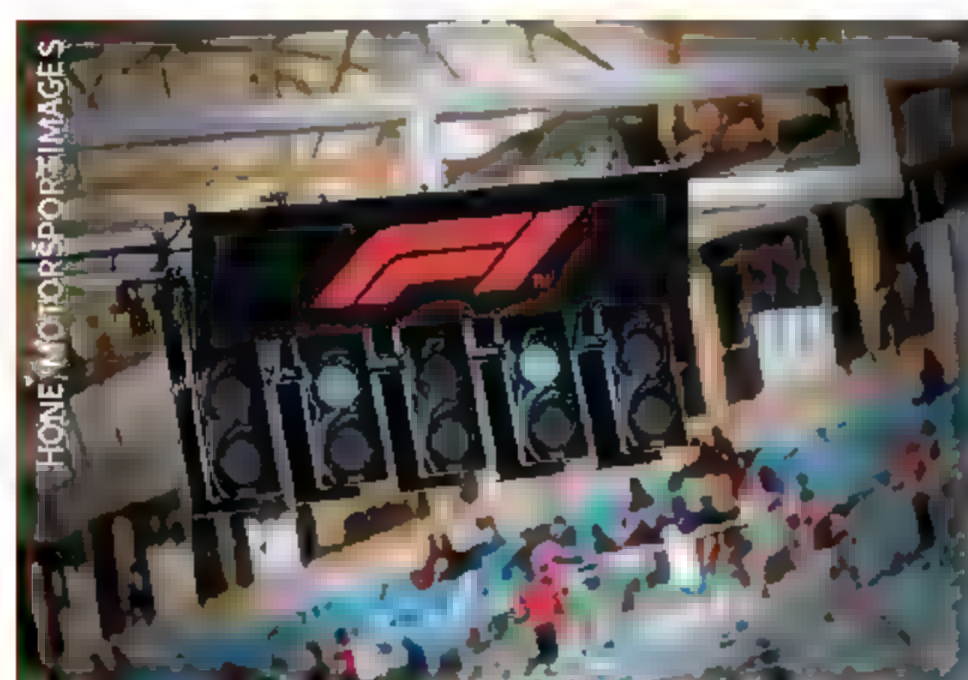
"We need all of the solutions," he said. "There are places where electrification is straightforward and absolutely the best thing to do for the most efficient use of energy.



There are solutions where you simply cannot do it by electrification."

Fellow panel member Alberto Longo, Formula E's chief championship officer, agreed that "there is a space for all" options.

"I remember Alejandro [Agag, Formula E co-founder] saying, 'We no longer ride horses to work, but we still have horse racing,'" he said. "Honestly, I believe there is room for absolutely everyone."



FORMULA 1 REVEALS SCHOLARSHIP PLAN TO IMPROVE DIVERSITY

Formula 1 will pay full tuition fees for talented young engineers from underrepresented backgrounds to complete their degree as part of a diversity push. Students will also be given a living allowance so they can focus fully on their studies.

F1 announced last June that it would form a new foundation to fund apprenticeships and scholarships to improve diversity, following calls led by world champion Lewis Hamilton to enact change. Speaking in ASI Connect's Future of Formula 1 session last week, F1 director of strategy and business Yath Gangakumaran said the scheme would "show we're not just all talk, we're going to execute on our actions as well".

"We're working with all of the teams to ensure these scholars are then given work experience opportunities at the teams," he said, adding that opportunities will also be provided for people from traditionally underrepresented backgrounds to work in the F1 organisation to "gain qualities and skills that can be transferable to other organisations".

PURE ETCR SET TO 'SHIFT PEOPLE'S PERCEPTION'

The series director for the new Pure ETCR electric touring car championship is hopeful that it can contribute to a mindset change on electromobility.

Speaking in the Future Power session at last week's ASI Connect, Xavier Gavory promised a "super-spectacular" maiden season for the series, which was delayed from its planned 2020 start date because lockdown restrictions meant battery supplier Williams Advanced Engineering couldn't service the cars.

The five-round championship begins at Vallelunga in June, before visiting Zolder, Motorland Aragon, Copenhagen and Inje in South Korea.

"It's going to be fast and it's going to be furious," he said. "We are talking about the most powerful touring cars ever produced; they will produce 500kW which is the equivalent of nearly 700 horsepower. It's going to be super-spectacular.

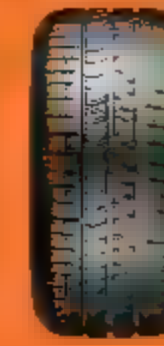
"We need to shift people's perception about electromobility, show them that the cars are super-exciting to drive, and that they are not only made to go shopping and get the kids to school. It's real cars, with real performance and real emotion."

Testing continued earlier this month at Vallelunga, with Cupra and Hyundai in attendance for all three days.

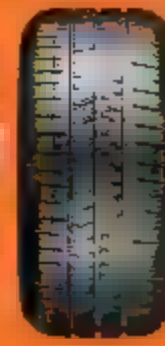


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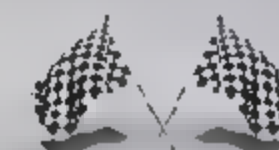
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NEW SRX SERIES RACER COMPLETES PUBLIC SHAKEDOWN

The chassis that will form the basis of the new Superstar Racing Experience series underwent a successful shakedown at North Carolina's Caraway Speedway last week, with NASCAR veteran Ken Schrader at the wheel.

SRX, a modern-day take on the IROC series that featured predominantly NASCAR and Indycar drivers racing against each other in identical equipment between 1974 and 2006, is the brainchild of three-time NASCAR Cup champion Tony Stewart and former NASCAR crew chief and team owner Ray Evernham. The series

boasts a driving cast that includes final IROC champion Stewart, fellow NASCAR title winners Bill Elliott and Bobby Labonte, and open-wheel aces including Marco Andretti, Tony Kanaan, Helio Castroneves and Paul Tracy.

Each will drive identical SRX machines designed by Evernham, powered by a 700bhp Ilmor V8 engine. SRX will race on six short-track ovals, including dirt tracks, on six consecutive Saturday nights beginning at Stafford Motor Speedway in June. All races will be carried on primetime US television network CBS.

FIA INTRODUCES NEW IMPACT DATA RECORDER

The FIA has launched a new low-cost Impact Data Recorder that aims to improve understanding of accidents and improve safety standards across all levels of the motorsport pyramid.

It is estimated that high-end accident data recorders are currently fitted to less than 1% of racing cars. As such, in studies of serious incidents to determine how survivability can be improved, data from amateur racing – where most fatal accidents occur – is largely absent.

The FIA's Safety Department and British company AiM Technologies have developed a low-cost alternative, which it is hoped will be widely adopted by competitors at grass-roots levels. Measuring 6cm, the battery-powered device weighs 12g, is designed to be fitted without technical support, and is capable of recording over 80 incidents during its two-year lifespan.

Using a mobile app, data from the device can be downloaded and distributed by the user to their national ASN.



GOODYEAR AGREES DEAL TO BUY INDUSTRY RIVAL COOPER

World Rallycross tyre supplier Cooper Tire announced last month that it has "entered a definitive transaction agreement" under which it will be acquired by US rival Goodyear.

A statement released by Cooper said that the transaction "has a total enterprise value of approximately \$2.5billion". Once complete, Goodyear shareholders will own approximately 84% of the combined company.

Cooper already has a number of tyre brands steeped in motorsport heritage under its control, including the Avon make it bought out in 1997. Avon supplied the British Formula 3 Championship between 1982 and 2008, before Cooper took over until the championship's 2014 demise. Avon also had a title sponsorship agreement with British GT between 2006 and 2015, and supplied every International Formula 3000 championship race between 1985 and 2004.

Goodyear boss Richard J Kramer said the deal was "an exciting and transformational day" for the company, which currently has supply deals with NASCAR, the ACO for LMP2 racing, the British Touring Car Championship and WTCR.

IN BRIEF



FIA SIGNS UP TOP FE MAN

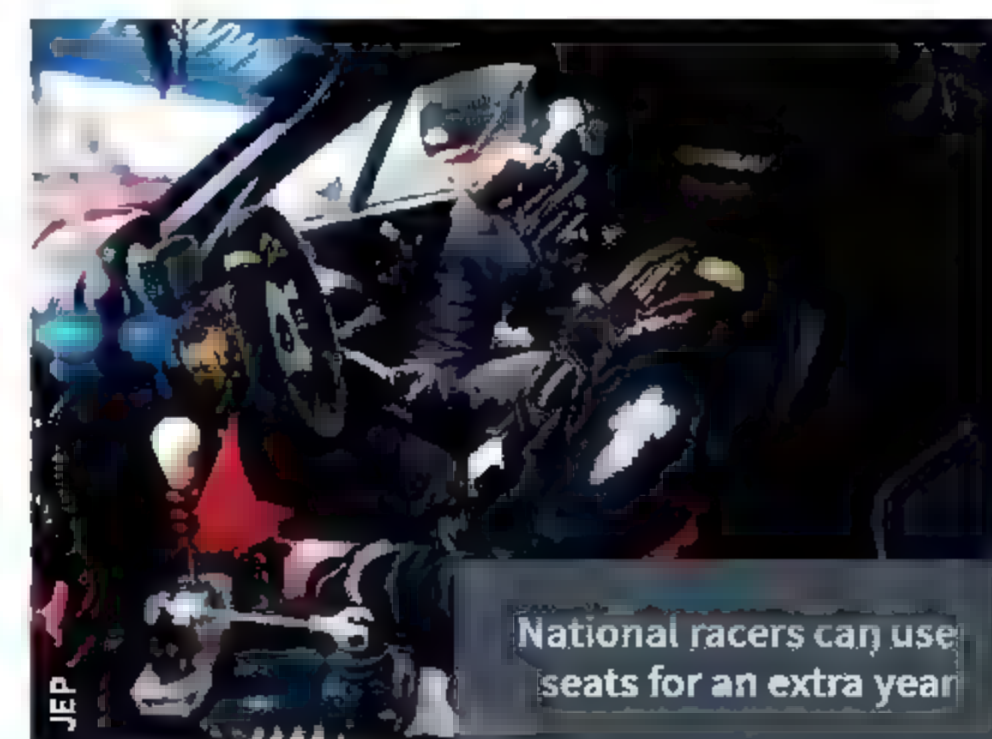
The FIA has appointed the former Performance director of PSA's DS brand to become the new technical director of its Sport division, replacing retiring ex-Ferrari F1 engine man Gilles Simon. Xavier Mestelan Pinon (above right) spent 20 years at Citroen Racing before moving to PSA performance marque DS, where he oversaw back-to-back Formula E titles with Techeetah. FIA secretary general for sport Peter Bayer said Mestelan Pinon would be responsible for implementing "the future technical vision across a range of FIA championships", with a particular focus on advanced powertrain development.

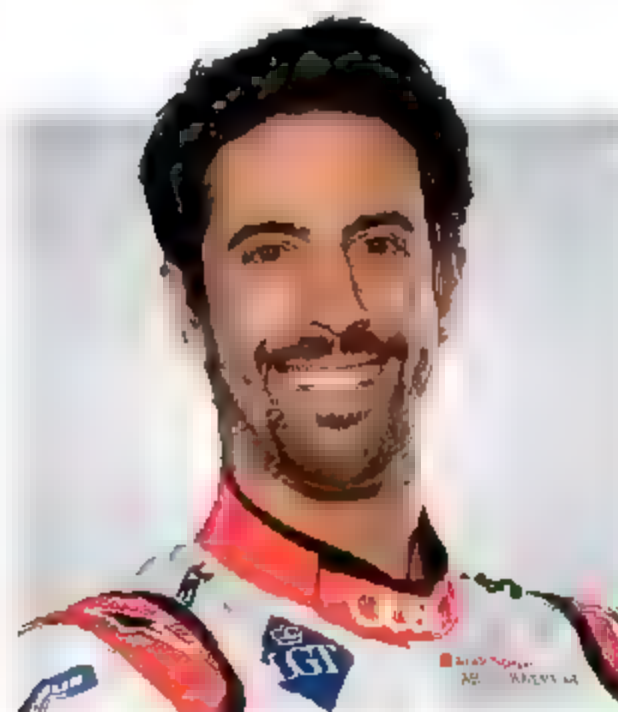
FS ENTRY REVEALED

Formula Student has released a 130-team entry list for its 2021 event after holding an online-only contest due to COVID-19 in 2020. Universities from 20 countries are set to participate in the competition organised by the Institution of Mechanical Engineers, although it remains unclear whether a live event at Silverstone in July can take place. An IMechE statement said: "The organising committee is determined that a competition will take place in 2021 and has developed several scenarios, including options for a live event."

SEAT STANDARD EXTENDED

The FIA homologation of racing seats that either expired in 2020 or are due to expire in 2021 will receive a one-year extension from Motorsport UK. Intended to aid competitors who have been unable to benefit from the full usable life of seats due to the COVID-19 pandemic, the freeze applies to seats manufactured in 2013 that can be used for up to eight years from the date on the original homologation label, and to those with a 'Not Valid After' date of 2019. The exemption will cease from 31 December 2022.





EXPERT VIEW LUCAS DI GRASSI

THE BIG QUESTIONS OVER LMDh/LMH PARITY

Excitement over the 2023 Le Mans 24 Hours is understandable, but will LMDh and LMH be a short-lived unity?

It's amazing to see what the ACO has done to bring the Le Mans 24 Hours alive again, with new regulations designed to allow manufacturers to compete with the same car in the World Endurance Championship and IMSA SportsCar Championship. For fans of sportscar racing and people who work in that orbit, it's exciting to see the interest it has generated with Ferrari joining Toyota, Peugeot, Acura, Porsche and, of course, Audi from 2023.

But I have my concerns over the viability of having two such different categories as Le Mans Hypercar (LMH) and Le Mans Daytona hybrid (LMDh) competing for overall victory because, regardless of who wins or how the Balance of Performance is developed, there will likely be a significant advantage to one or the other. In the longer term, I don't think that the two categories can co-exist and time will tell which one will survive.

If a manufacturer goes to LMH, invests a lot of resources in developing a hybrid car from scratch but gets beaten by an LMDh car using a spec Bosch hybrid system that is based on an LMP2 chassis, it will be very hard to justify this investment. On the other hand, nobody knows at the moment if LMDh cars will have a chance

to beat a 'thoroughbred' LMH car designed entirely by a manufacturer. That is an important concern for teams and drivers.

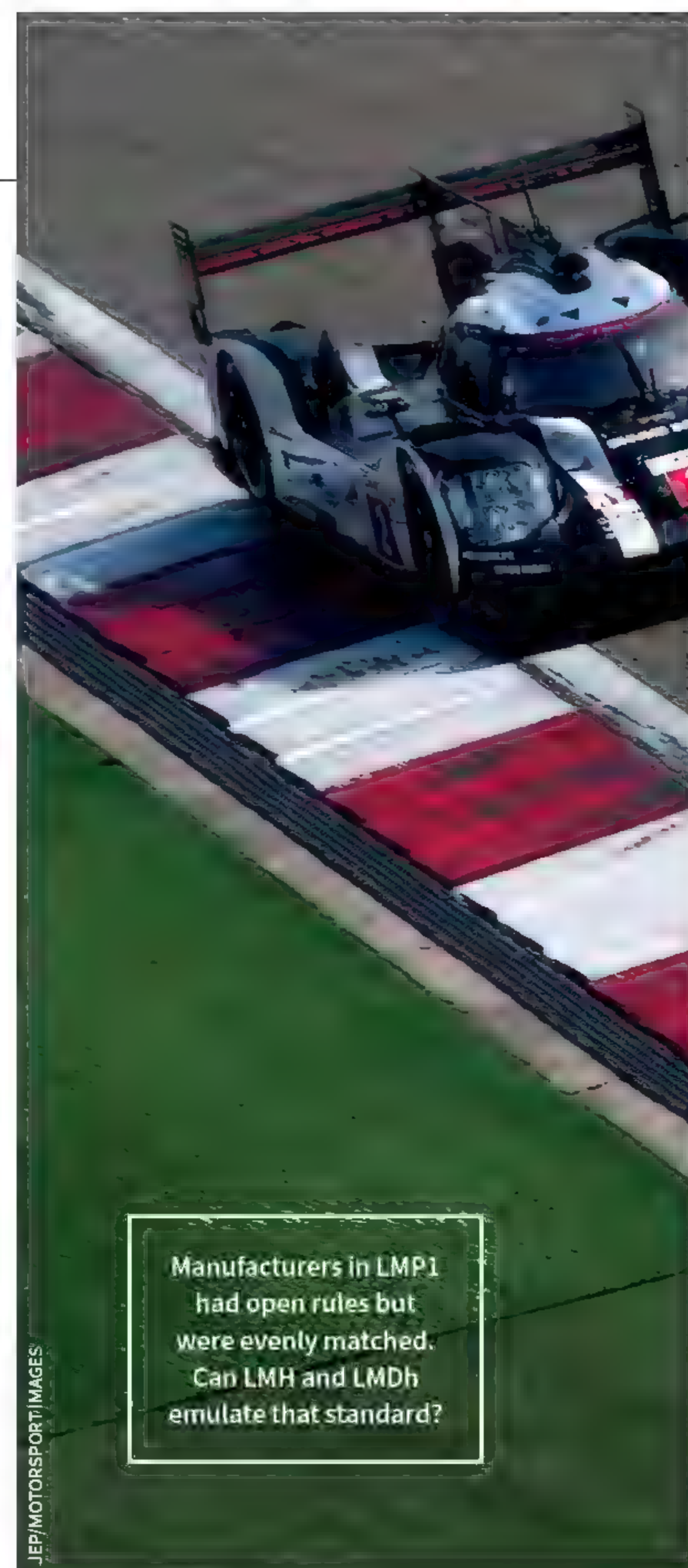
People can argue that it's only fair that LMH teams are rewarded for being the main category from the ACO, but fair or not fair is irrelevant. The questions should be: 'What is the championship's ultimate purpose and how can we maximise technology development/entertainment?'

I wasn't surprised that Audi went down the LMDh route. As I understand, it's not yet decided what configuration of engine it will use or where it will race, but the cost-effectiveness of running an LMDh car that can also race in the US is far better than building a hybrid LMH car from scratch that can only race in WEC – especially when you're going to have BoP anyway. Maybe you have more control, maybe a better chance of winning and more freedom of development in LMH, but it involves a bigger budget without the necessary technology gains – as the hybrid systems of this new generation are way below the levels seen in the LMP1-HY era.

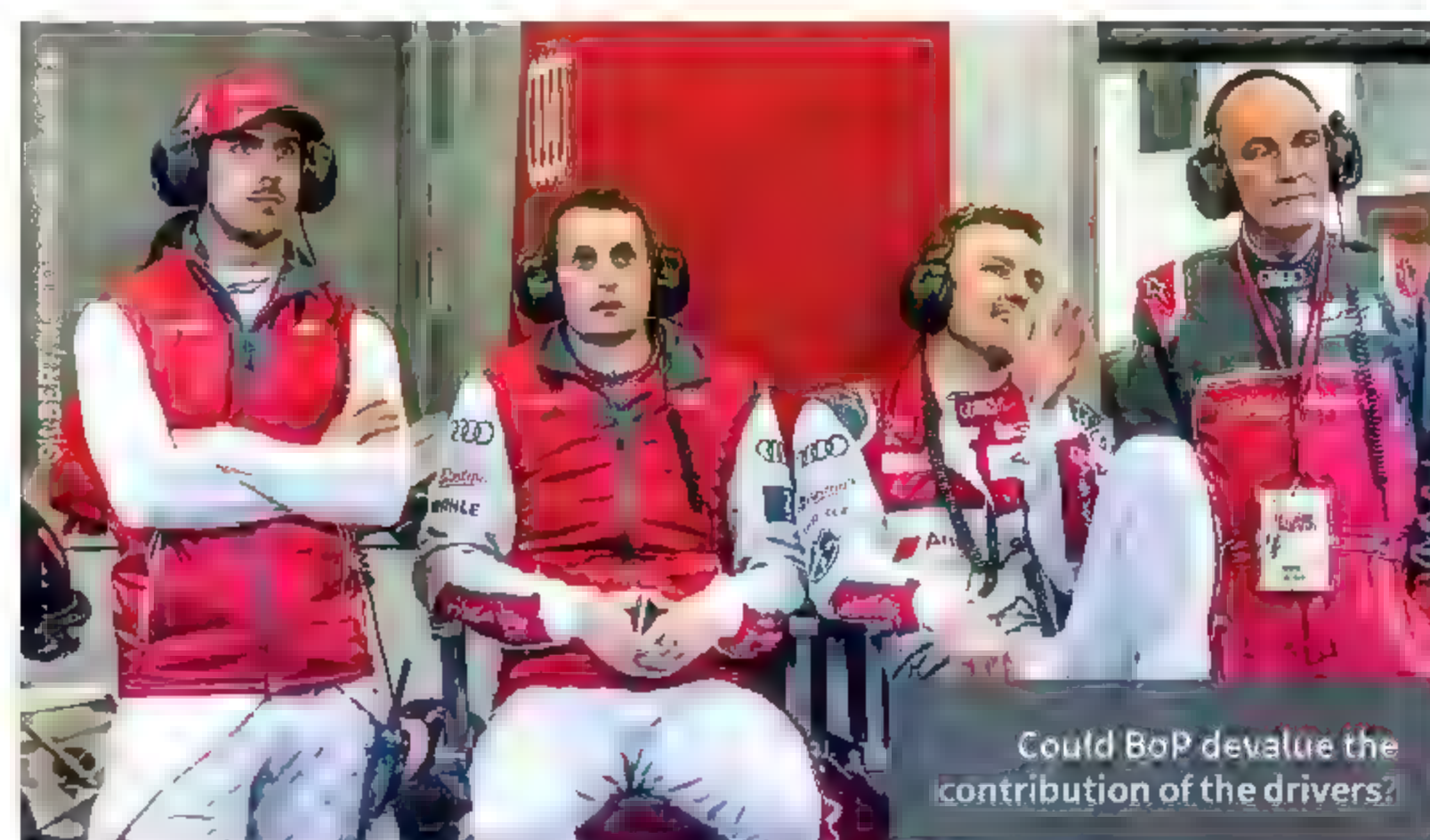
I understand and fully support why BoP is considered an essential way to ensure parity, but this also concerns me on several levels. For starters, in GTE the impact of the BoP is so great that even if you have the best team of drivers, in most cases you

will not win if the BoP is wrong. This has nothing to do with car development, it's purely a decision from the regulators and rules, which we've seen time and again over a number of years.

Since 2017, IMSA has done a good job of balancing the normally aspirated 5.5-litre V8 Cadillac, two-litre turbocharged inline-four Mazda and twin-turbo 3.5-litre V6 Acura within its Daytona Prototype international (DPi) formula (that becomes LMDh from 2023). But the sporting rules in IMSA – for example, backing everyone up behind a safety car whenever there is an incident – has a stronger weight on deciding results and creating entertainment.



JEP/MOTORSPORT IMAGES





The two classes will produce the same maximum power and have the same minimum weight, but LMH is still allowed four-wheel drive, which will be a massive advantage over LMDh in the wet. How will the regulators balance the cars for these different conditions, different situations? That will be very tricky.

Another important concern is that manufacturers will try to trick the BoP to gain an advantage. The teams naturally will do that, but you don't want to see that in a highly competitive series and in one of the world's most prestigious races. You want to see the best competition possible, and know that the best team and car won.

You can argue nowadays, development of the internal combustion engine in motorsport is useless for future road car applications. That was what Honda said when it exited Formula 1, for example, and as more companies announce that they will only produce EVs, it's clear that developing an LMH or LMDh car to win at Le Mans is becoming more of a marketing and branding exercise than about technology development. There is very little road-relevant technology being developed that can be transferred directly to road cars and we can see in the success of DPi that reducing costs is so important to have manufacturers involved.



This is why I think LMDh could have an edge. Either way, in the long run I expect it will be very hard for both to co-exist. If a brand like Porsche or Audi in LMDh doesn't win anything, they will either stop altogether or do LMH – or the opposite will happen and LMH manufacturers will pull out.

Having said that, things are ultimately going in the right direction because LMP1 Hybrid was unsustainable, the cars were extremely complex and the return on investment was not there for the budget spent. The standard hybrid packs in LMDh will not be even close to the technology that we had back in 2016 in the later stages of the Audi LMP1 programme, which was really the peak of engineering, rivalling F1

technology. But that's not such a bad thing.

When discussing the future of any racing series, you have to imagine a chair supported by three legs; entertainment, cost and R&D. It is extremely difficult to balance all of them. Freedom in R&D will lead to high costs. To have entertainment – the competitive racing we all crave – then you need the cars to be similar in performance by limiting R&D.

The true test will come when LMDh cars join in 2023, but for the time being I believe the ACO and FIA have done a great job. After recent years when it's been clear who the winner will be, I can't wait to see a 10-way fight for overall victory at Le Mans again. Endurance racing is going in the right direction. ■



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ENGINEER'S VIEW MICHAEL PEINSITT

KEEPING AHEAD OF THE POWER CURVE

AVL's VSM offers race series and manufacturers a means of weighing up pros and cons of future propulsion methods

Currently there is a big push towards electrification in motorsports, but what will the favoured fuels and propulsion technologies of the future be? E-fuels, hybrid, BEV (battery electric vehicles), fuel cells or hydrogen combustion?

Personally, I think the jury is still out. Technology is evolving for all of those options, but we can't really judge how fast they will develop. All have potential, so we will have to wait a few years until at some point the solutions will converge for the category-specific boundary conditions, like for example the race duration.

But what AVL can offer to rulemakers who want to compare different concepts, as well as manufacturers and teams that want to get the most out of the regulations, is our VSM vehicle dynamics simulation tool that covers all the above propulsion options.

AVL has developed the VSM since 2000, when it was initially designed as a tool for a testbed. We soon realised it could also be used for other applications; from off-line cloud-based simulations to a driving simulator or any hardware-in-the-loop or software-in-the-loop testing. This means you have a common model across all those different applications that can easily compare apples with apples.

With E-fuels still early in development, we have to work closely with suppliers to get the chemical properties of the fuel and use that with our existing simulation models to get figures for torque, fuel consumption, whatever you're interested in as the outputs. For a simulation, the old saying applies of 'garbage in, garbage out'. If we get incorrect input data, then we will also have wrong outputs, so we rely a lot on accurate input data for our simulations to be correct. Of course, we will always try to correlate the simulation data with real

"VSM enables the stakeholders to make an informed choice on which technology to use"

world data, to ensure that what we simulate represents reality as closely as possible. Only once we have achieved that and we're sure that the simulation gives the right answers can we look at different options.

A lot depends on what each individual series wants to achieve. If the boundary conditions are to run a 300km race without top-speed limitations, or extensive stops to refuel or to recharge a battery, that will dictate where you will go. The ACO has allowed hydrogen vehicles to compete

from 2024, which could give teams plenty to consider before they commit to one specific means of propulsion.

Even if we don't know the full boundary conditions for a series yet, together with rulemakers we can simulate different concepts such as power requirements, packaging requirements and cooling requirements, weight distribution and overall weight of the car. Without building any hardware, just with the respective input data, we can compare a number of different concepts not only in terms of lap time but

also of vehicle handling, stability and forces through the tyres to draw a refined picture of how the car would behave on the track. This enables the stakeholders to make an informed choice on which technology they would like to use, without the need to build prototypes and spend a lot of money.

To improve the efficiency and accuracy of the predictions, we use cloud computing together with AI optimisation approaches. Typically before a race or a test, we run a simulation at a range of 100,000 laps. That's a lot of information to analyse, so we created a tool called Simbook for engineers in the early development stages and also at the track to make quick decisions.

Development never stops. We have around 25 software programmers working in preparation for future technologies to make our simulation results faster and more precise, even as the number of options increases. The VSM can model almost any conceivable hybrid configuration, and I anticipate similar things will happen with other propulsion technologies as well. We are always on our toes to make sure our customers have access to the tools that can simulate what they need. ■





THE HIDDEN HERO BEHIND ALONSO'S ENSTONE GLORY YEARS

As Fernando Alonso returns to the team with which he scored his two world titles, he will hope it can recapture the spirit embodied by the late aero guru Dino Toso

BY JAMES NEWBOLD



The nature of modern Formula 1 is such that cars are designed by committee, which means it's near-impossible to single out the efforts of one person for any resultant success. But if it's too simplistic to lay credit at the feet of one individual, equally it would be fatuous to suggest that individuals can't make a difference, for they can lift the team around them to greater heights and push the collective effort forward in a positive direction. Such hidden heroes are common in racing, but few can live up to the story of Renault's former head of aerodynamics Dino Toso.

In the four years that followed his diagnosis with lung cancer in 2004, Toso contributed to 17 grand prix victories (14 for Fernando Alonso, two for Giancarlo Fisichella, one for Jarno Trulli) and two world championship doubles with Alonso, leading by example until his retirement just two months before his death at the age of 39 in August 2008. Never losing hope that he could beat the cancer, he endeavoured to take his rounds of chemotherapy at weekends so they wouldn't impinge on the working week, and signed up for every trial available to him. But despite the physical

transformation the steroids inflicted upon his body as this committed cyclist gained weight and lost his hair, Toso's good humour and team spirit never diminished. Thirteen years on, he remains a widely admired figure that his Enstone family remember fondly.

"It's very easy when people are no longer with us to remember all the good things," says former Renault engineering director Pat Symonds. "But Dino was a very clever person, very pragmatic and a genuinely nice guy."

"He was a bloody good guy," agrees ex-Renault technical director



Toso became a key player at Enstone after switching from race engineer role at Jordan

Mike Gascoyne, “and that’s why he achieved what he did.”

Toso, half-Dutch and half-Italian, had studied mechanical engineering at Delft University before taking a masters in aerodynamics at Cranfield. Armed with this understanding, he cut his teeth in the Italian Superturismo championship engineering for Gianni Morbidelli. The Jordan F1 tester was suitably impressed and made the introductions to his superiors. Toso was soon hired by technical director Gary Anderson and Sam Michael, who at the time headed up the R&D department.

“I remember interviewing him for his

first job at the end of 1996, and I gave him a job straight away,” recalls Michael, who went on to be technical director at Williams between 2004 and 2011. “He came on board as a data engineer on the race team in 1997, and then we both became race engineers in 1998. We had done various test engineering during 1997, and then in 1998 I was the race engineer for Ralf Schumacher and he had Damon Hill.”

The 1998 season took a while to get going for Jordan, a legacy of delays with the electronics as the team adapted from Peugeot to Mugen power, until incoming technical director Gascoyne got to work

in the windtunnel. “The front-wing flaps didn’t work,” he says.

From mid-season the year turned around, with Hill scoring back-to-back fourth places at Hockenheim and the Hungaroring before scoring the team’s first win in memorable fashion at Spa. Hill recalls “a lovely guy, obviously very bright”, who “always had a grin on his face like he knew all of the answers”. But was the 1996 world champion ever concerned about Toso’s relative inexperience in race engineering?

“No, not at all,” Hill asserts. “What I found with Dino was he was very open ►



to listening to what I was trying to say and then turning it into engineering-speak. I got the impression that he was very much at the early part of a very steep learning curve.

"He wasn't forceful — some people would take charge of things — but he was very helpful and cooperative. He wanted like any good scientist to know the answers, and if he didn't understand something he would want to learn more to try and understand what the answer might be."

Gascoyne concurs: "He was a strong-minded guy who would listen and learn very quickly. Sometimes straight-talking, confident guys don't actually listen to anyone because they think they're right, but Dino wasn't like that, which is why he became as successful as he did."

"He was an incredibly smart engineer, really focused on aerodynamics," recalls Michael. "We were both seven-day-a-week-type people, so got on very well. And even though Dino and I probably had more run-ins than anybody else, it was all brought out of passion to be successful

and help the team be successful."

Hill bowed out of F1 after a disappointing 1999, in which Schumacher's replacement Heinz-Harald Frentzen won twice and finished third in the points, but he had seen the high regard his colleagues held for Toso. "I had the sense that he had some brilliance to him," he says. "The potential was huge."

Michael agrees: "His intelligence level around aerodynamics was second to none and he had the drive with it as well, so he had the passion and work ethic to produce."

"He was a very blunt person as well, which as an Aussie meant I could easily understand him. In fact, probably in his early days that probably hampered his progress somewhat because he was very passionate and would very much put himself out there. But perhaps that turned into one of his great skills and he commanded a lot of respect."

Toso remained with Jordan to engineer new arrival Trulli in 2000 before following Gascoyne to Benetton in December, working under chief aerodynamicist John Iley. "I didn't actively court Dino,

he approached me," asserts Gascoyne.

"He'd decided that being a race engineer was great, you're in the pitlane and people talk about you, but if you want to be a chief designer or a technical director then you've got to go back and design racing cars. And race engineers don't do that."

"He took a paycut to come in as one of three senior aerodynamicists and run a development team. He was obviously good at it, he was always going to rise up, but what was most impressive about Dino was the fact that he was prepared to step back from a very public role as a race engineer and he was confident enough in his ability that he would get there. He knuckled down and he was prepared to do it properly."

Straight away, he showed Symonds what he could do, putting his real-world nous to use. Symonds had done basic aero work himself in the 1980s and early 1990s before focusing his efforts on track engineering as the field became more specialised, and found Toso a breath of fresh air.

"There are a lot of aerodynamicists who perhaps understand aerodynamics, but don't understand what makes a car go fast or how to design parts on a car," says Symonds. "The classic sort of aerodynamicist may get you the best windtunnel figures, but an aero map that's totally unusable on the track, or design structures that can't support their own weight. What I liked about Dino is that he'd worked as a race engineer at Jordan and he certainly understood what was required to make a car go fast as opposed to producing nice numbers in the windtunnel for the boss. I really appreciated that."

Gascoyne's arrival coincided with an influx of investment at Enstone following Benetton's takeover by Renault in March 2000. He focused on laying the groundwork by improving the windtunnel programmes and model quality, and found a key ally in Toso.

"He'd seen it work at Jordan, so he believed that this approach was going to work and he threw himself in with all his energy into that drive," says Gascoyne.





“You could see that he knew what he was talking about and was good with people”

“Where some of the established people were kind of like, ‘I’ve heard all this before, yeah, yeah, yeah’, Dino was ‘No, no, no, this is the way it’s got to be, we’re doing this.’”

It certainly had an effect — from back-row fodder at the beginning of 2001, the B201 was on the podium at Spa in September in Fisichella’s hands, and the renamed Renault team — which signed Trulli to partner Jenson Button — was firmly established as best of the rest behind the big three in 2002, Button narrowly missing out on a maiden podium in Malaysia.

When Iley left for Ferrari in 2003, Toso took over the aero department and it coincided with the team’s first win since Hockenheim 1997, scored by Alonso — a replacement for Button — at the Hungaroring. Symonds believes Toso had shown the capacity for leadership early on.

“Dino had a reasonably large group working for him and it was very obvious that he led that group through mutual respect rather than being dictatorial,” he says. “It would be probably looking at it through rose-tinted spectacles to say that we looked at it and immediately thought he was the future head of aero — although maybe Bob [Bell] did. You could definitely see that he knew what he was talking about and he was good with people.”

Dr Robin Tuluie, then head of R&D at Enstone, adds: “It’s rare that you come across someone who is both technically really strong but also has that kind, benevolent style of leadership and guidance and understanding towards his team. And not just his aerodynamics team, but his whole team.”

But it was another quality that ►

Trulli dedicated his 2004 Spanish GP podium to Toso and gave him the trophy



Symonds regarded Toso as a breath of fresh air

“He was very, very honest. If it didn’t work, then he’d say that it didn’t work”

Symonds liked most in Toso. “He was very, very honest,” he says. “It sounds odd to say, but you’d be surprised by how many engineers have the ability to find the result they’re looking for rather than the result that’s there. If it didn’t work, he’d say that it didn’t work, where others would just keep on going trying to make it work and spending a fortune doing it, but more importantly losing time when they could have been working in a more productive area.

“Dino was incredibly pragmatic, he really knew whether something was going to turn out good or not. And in that lead-up to the championship years, he contributed a massive amount.”

Renault’s progress continued despite Gascoyne departing for Toyota midway through 2003, with his deputy Bell



Toso’s work on Renault R25 helped lift the team to the front

taking over as technical director. The following year, Trulli took his maiden victory in Monaco, and Renault narrowly missed out to BAR for second place in the constructors’ championship. But the team was rocked by the revelation days before the Spanish Grand Prix that Toso – who had never smoked in his life and kept himself in good shape – had advanced lung cancer and had been given six months to live.

“I remember that day so well,” Symonds says. “I was over at [Renault

engine HQ] Viry when I got a call from Dino, who wanted to know if I knew [F1 doctor] Sid Watkins’s phone number. I put him in touch with Sid and he was absolutely brilliant. Straight away, he started working with him.

“It was terribly hard because you couldn’t put it out of your mind. You’d be sitting in a meeting talking to Dino and know what the situation was. But he was just brilliant, the way he always wanted to be a part of what was going on.”

While liaising with oncologists around the world, Toso refused to allow his focus on the job to slip.

“I remember he came in and Bob said, ‘Look Dino, you don’t need to come in, go and look after yourself,’” recalls Tuluie. “And he said, ‘No, you don’t understand – I need to be here, I need the team and the interaction.’”

Symonds is the first to admit that the 2005 Renault R25 wasn’t as quick as the McLaren MP4/20, but feels it “certainly had the most complete package”, which proved crucial as Alonso saw off the challenge of Kimi Raikkonen to claim the world title.

Michelin responded better to new tyre regulations that required a set to last an entire grand prix, pegging back the advantage Ferrari had established with Bridgestone, while revised aerodynamic regulations that raised the front wing,



Alonso bested Gascoyne’s Toyota team and faster McLaren for 2005 title



moved the rear wing forward and reduced the diffuser size meant that Toso's aero department was put to the test to make up the shortfall. But the influence of his group was felt in other ways too, not least the innovative V-keel suspension design, says Symonds: "The majority of the car is designed in the windtunnel these days, and without a doubt the V-keel would have come from the windtunnel I would say."

The V-keel combined with the car's tuned mass damper brought greater stability, and the R26 of 2006 was even better as Alonso defeated a resurgent Ferrari and Michael Schumacher. Even more impressively, as Symonds points out, that was despite Renault's 2005 advantage being taken away by the return of tyre changes. "It was a much tougher year, but the R26 was a great car," he recalls.

By 2005, Trulli — who dedicated his 2004 Spanish GP podium finish to Toso and afterwards gave him his trophy — had joined Gascoyne at Toyota and their renewed partnership started well. The Italian was pipped to pole at the 2005 Australian GP by Renault returnee Fisichella, before finishing second to Alonso in Malaysia and Bahrain. While frustrated at being thwarted by his old team, Gascoyne takes satisfaction from knowing the involvement Toso had in the project's success.

"It was good to see their success,

especially once you knew Dino wasn't well," he says. "It was no surprise that he did what he did."

For the 2007 season, all teams used Bridgestone tyres — the first time this had happened since 2000 — and Renault was caught on the back foot. Team newcomer Heikki Kovalainen scored the only podium of the year with second at a sodden Fuji as Renault slumped to fourth in the constructors' standings, promoted to third when McLaren was booted out for its part in the spy scandal. But Toso had much more pressing matters to concern him.

The cancer that he'd fought so bravely — and which for a while had been kept at bay by a pioneering new drug — had intensified. Toso left Renault in June 2008 and died just a few weeks later, leaving behind wife Nathalie — a rock throughout his treatment — and young daughter Isabella.

In his absence, 'Team Enstone' has gone through various guises as Lotus, Renault again and now Alpine, but is still waiting for a return to the glory days of 2005–06. Symonds believes that Toso's broad skillset would have made him an ideal candidate to one day become a technical director and have an even bigger role in shaping



an F1 team's fortunes.

"Particularly these days, so many engineers are very compartmentalised and there are fewer and fewer people who understand everything about what makes a car go fast," he says. "There are people who are very good at aero, there are people who are quite good designers, there are people who understand vehicle dynamics, but there aren't that many people who can put it all together, whereas Dino was one of those."

"When you couple that with the fact that his personality was very good, his ability to work with people was very good and his ability to motivate was very good, he would have been an excellent technical director."

Adds Gascoyne: "For any young engineer, Dino would stand as a pretty good person to judge yourself against. Actually, for any role in life to be honest." ■



PLAYING PSYCHOLOGIST AT 300KM/H

The job of a Formula 1 race engineer requires in equal parts engineering skill and acute sensitivity – not an easy combination when the pressure is on

BY FILIP CLEEREN

Ever since team radio messages became part of the Formula 1 broadcast, the often-colourful interaction between driver and race engineer has been a popular staple of grand prix coverage. But just like most team communication, the finer nuances of the race engineer role stay out of the public spotlight. The unique blend of engineering, infused with a human touch, makes the role one of the most challenging and rewarding in motorsport – as Alpine race engineer Karel Loos knows well.



Loos is excited to be forging a relationship with double world champion Alonso



Alonso's drive, energy and commitment are pushing the team forward

like the car is there or thereabouts, that already makes a weekend so much easier. Getting it right, especially in qualifying and the race, is quite rewarding for me and for the group of engineers behind the cars."

A race engineer is not just a technical mastermind, but also the first point of contact for a driver within a team. The most public display of that interaction occurs during the adrenalin-laden grand prix weekend, when race engineers take to the airwaves to inform their respective drivers or attempt to keep them calm. But whatever makes it into the TV broadcast is just the tip of the iceberg.

"You hear my voice to the driver, but I have about seven or eight people

"It's quite challenging to manage the radio traffic. It's not made public, fortunately!"

Belgian-born Loos, who joined the Enstone team in 2011 in its Lotus guise, worked his way up from performance to race engineer and worked closely with Kevin Magnussen, Jolyon Palmer, Carlos Sainz Jr and Daniel Ricciardo. This year, F1 returnee Fernando Alonso will be added to that list.

Loos sums up his job as "trying to get the most out of the car-driver combination". The process for solving that equation starts with preparation at the factory, well before the cars hit

the track on a grand prix weekend.

"We need to make that work with the tools we have in the way we're structured as a team," Loos explains during a now-standard video call prior to the Bahrain pre-season test. "You still have your area, but as a race engineer you're kind of putting the puzzle together.

"There's a lot of preparation work in terms of where you want to go with set-up and trying to understand problems from previous races. And when you get into a race weekend where you straight away feel

almost constantly talking to me at the same time," explains Loos, who studied for his Masters in Motorsport Engineering and Management at Cranfield University to complement his previous engineering studies in Belgium. "It's quite challenging to manage the radio traffic behind the scenes, which nobody hears. It's not made public at all, fortunately for me!

"You hear probably the odd radio message on TV, but the amount of communication we give to the driver is quite large. During a race you're trying ►

ENGINEERING

to give the driver a picture of what is happening around them, who's doing what, where is he in his strategy, without giving it away to others. Things like that and managing things like tyres and fuel; there's so many conversations going on during the race that nobody hears. There's a lot going on. I think that's one of the difficult bits in the job.

"Traffic management in qualifying is also one of the more stressful moments, especially in Q1. I feel sending the car out for the first time in qualifying is one of the most stressful moments in the weekend, because where we are in the field that first run is quite important for us. We try to do it in one go, so we can save tyres for Q3. And getting it right, positioning

"He's very motivated. He's a guy that doesn't leave a stone unturned. And I really like that"

a car right on track is so crucial for that. In theory it should be a fairly easy run, but it's so easy to get that wrong. More often than not, we get it right."

In the heat of the moment, drivers must have blind faith in their race engineers, who in turn must try to understand what their charges are going through. But getting to that level of mutual understanding doesn't happen overnight. It's the result of a long process during which driver and engineer develop their own language, that Loos says can be "quite emotionally draining".

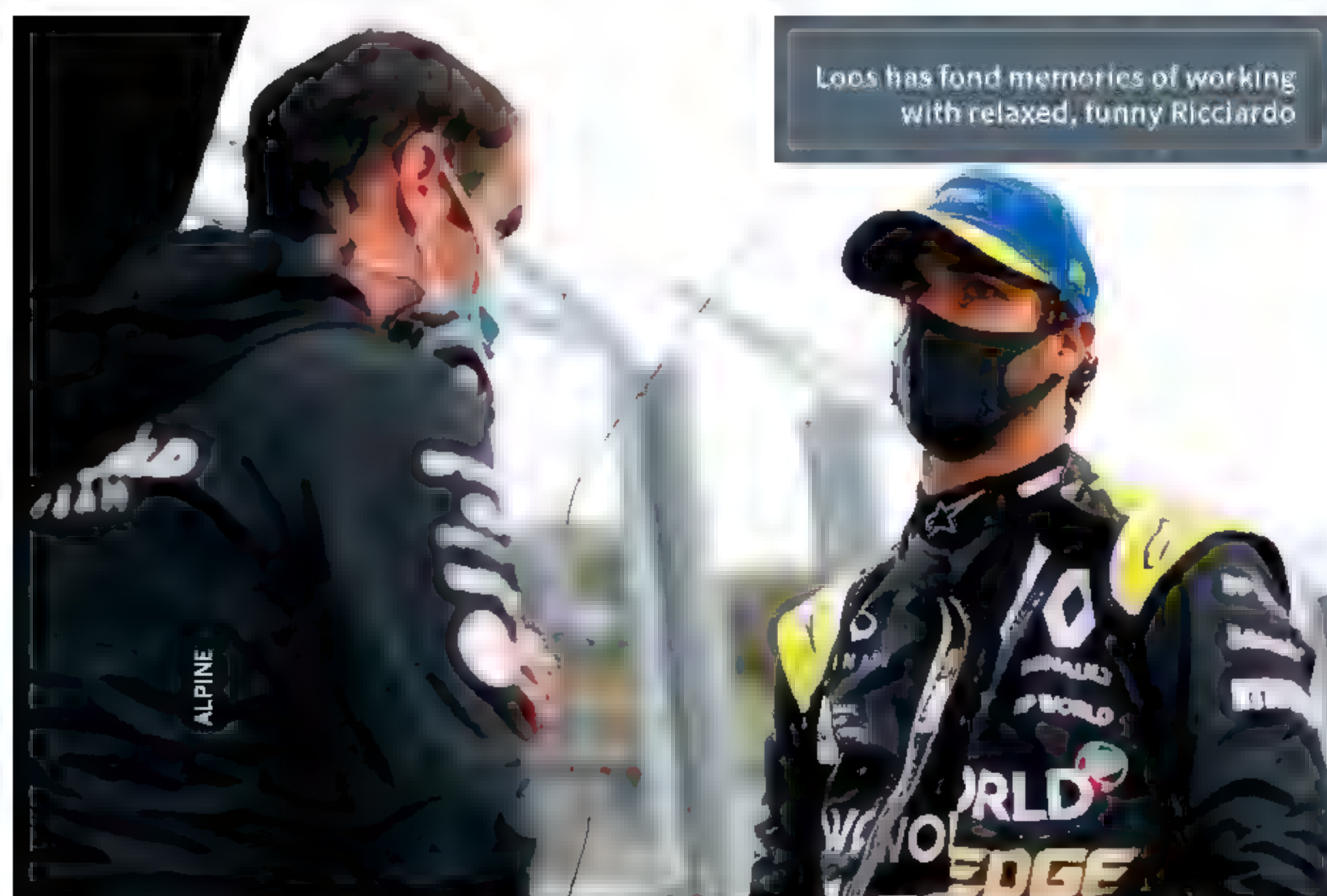
"With the relationship you build up with your drivers, you start to feel when they're in the right frame of mind and when they're not," explains Loos. "I think that's quite important to them, maybe [to] give them a little bit of motivation, or making sure that they're comfortable. And they know: 'Right, we can do well

here and there's no reason to panic'.

"These days, they talk about EQ and IQ [emotional and intellectual intelligence]. I think there needs to be a good mix of both and you also need a practical feel for things as well. It's important to listen, take their points on board and kind of empathise with them. I do talk a lot to my drivers and it takes time to build up that

relationship, because every driver will say that he has the same problem in a slightly different way. You need to adjust your dictionary a little bit."

Interestingly, the engineering side and driver management don't always align. The empirical data might show that a certain cornering technique or set-up choice yields a faster lap time, but if





Loos reckons there can be more lap time in the right frame of mind for a driver than a small set-up change

F1 RACE ENGINEER

CV

- 2021-** Alpine F1 Team – Race Engineer (Fernando Alonso)
- 2017-2020** Renault Sport F1 Team – Race Engineer (Carlos Sainz Jr, Daniel Ricciardo)
- 2015-2017** Lotus F1 Team – Trackside Performance Engineer
- 2014-2015** Lotus F1 Team – Race Support Engineer
- 2011-2014** Lotus F1 Team – Vehicle Performance Engineer
- 2010-2011** Selleslagh Racing Team – Race Engineer GT1
- 2009-2010** Cranfield University - MSC, Motorsport Engineering & Management
- 2004-2009** Karel de Grote Hogeschool Antwerp – Bachelor, Car Technology, Master of Science, Automotive Engineering



the driver isn't fully on board with how that translates to the cockpit, then compromises may be required. Sometimes, an engineer has to "think a bit like them and try to think how they feel", which may involve briefly letting go of the numbers.

"Having them in the right frame of mind is important," says Loos. "There's sometimes more lap time in that than a small set-up change."

With his experience of working for various Belgian sportscar teams in his early days, including the Selleslagh Racing Team Corvette in the short-lived FIA GT1 World Championship, the experience of dealing with a wide range of driver abilities has often proved handy to Loos.

"I worked with drivers that weren't always professional drivers," he says. "If a driver comes back and says he has an issue in a particular corner, in the grand scheme of things you look at the data and say, 'Well, you're losing the tiniest bit of time there'. But [if] your driver keeps pointing out he can go quicker there, sometimes you have

to compromise in other areas to make him happy. It's also about putting the numbers on the table and saying, 'Look, we can do this or this about the problem you're having, but we think it might compromise the car in other places'."

Loos experienced few such issues over the past two seasons while working with Ricciardo. He has fond memories of his partnership with the Australian, who has moved to join McLaren during the off-season.

"Daniel was pretty good, he is a fairly relaxed person," Loos says. "There have been qualifying sessions where we were joking on the radio just 20 seconds before the car went out, and then he nailed the qualifying and put in a good performance. The way you see Daniel on TV, I think that's the way he is. He's always been positive and appreciated what every single person in the team did."

As Ricciardo moves to McLaren, two-time world champion Alonso is his replacement at the rebranded and overhauled Alpine team. The arrival

of a double world champion has had a galvanising effect on the Enstone squad, his ever-demanding nature pushing the team on. In preparation for his F1 comeback, the Spaniard started visiting the factory and attending race weekends early on during the 2020 season, which was a telling sign of his commitment to the project.

"It was good to have a bit of a head start," Loos comments on Alonso's early involvement. "It wasn't easy because you kind of have to work with two girlfriends in a way! But it's been good and refreshing; he's come in with a very positive mindset. And he's pushing quite hard."

"He is very motivated, so that kind of gets us going as well. And he's a guy that doesn't leave a stone unturned. He is really pushing us and I really like that. It is exciting and you do respect his opinions. He brings quality knowledge and experience."

"I like to say you learn something new every day, and that's definitely the case with someone like him." ■



AFC Energy's
bespoke charging
system is a world first
in off-grid powering
of a sporting event



AFCENERGY

HOW EXTREME E'S CHARGING SOLUTION COULD TRANSFORM MOTORSPORT

The new off-road SUV series aims to go boldly into the unknown on several fronts, but perhaps its most significant measure will involve the energy source powering its fleet of cars

BY JAKE BOXALL-LEGGE

Extrême E has yet to turn a wheel in competition, yet its A-list roster of teams, drivers and owners has captured column inches the world over in anticipation of the first all-electric rally raid series. The 2016 Formula 1 championship protagonists Lewis Hamilton and Nico Rosberg do battle once more as owners of their own XE outfits, while 2009 F1 title winner Jenson Button will get behind the wheel of his own team's ODYSSEY 21 chariot to boost an already-impressive cast of racers.

The premise of the series is to draw attention to areas of the globe ravaged by climate change by racing on them, then working with scientists and ecologists to restore those affected zones. A noble and worthwhile cause, no doubt, which is especially pertinent as more attention has begun to fall on worldwide social and environmental issues. That said, producing a racing series with such a strong social mission statement would be for naught if, say, it fell into the trap of operating on a logistics system with little regard for eco-friendliness. But XE has thought of that.

Firstly, the paddock will not be transported from event to event through the medium of air travel. Instead, the XE ecosystem will set sail to each event on the RMS St Helena, a passenger/cargo ship that will ferry the paddock to each round. Quite how it will reach the more inland areas is an unknown, given a seafaring



vessel's inability to cope with the insurmountable challenge of land... But that's not the point. The ship has been refurbished with engines that run on low-sulphur marine diesel to control emissions, and the series even prides itself on upcycling its interior to reduce waste. That's perhaps a drop in the ocean (if you'll pardon the pun) compared to the emissions produced globally, but it remains true to the mission statement.

But the source of power for XE's fleet of ODYSSEY 21 SUVs is the key part of its commitment to remaining as emission-free as possible. Unlike its sister series Formula E, which charges its cars with glycerine generators to reduce NOx and

carbon emissions, XE has pushed the boat out and opted for hydrogen fuel cells to charge the cars. Hydrogen fuel cell-produced electricity has long been touted as the silver bullet towards ensuring that electric vehicles can derive their power from a clean and sustainable source, given the only byproduct following the intra-cell electrolysis reaction is water.

Provided by XE partners AFC Energy, the use of hydrogen to power up the cars is yet to reach motorsport's mainstream, and has only ever appeared in futuristic concepts from the more notorious championships. Although the proposed HYRAZE series — set for a 2023 launch — plans to use hydrogen fuel cells within the cars directly, XE's partnership with AFC Energy is the first high-profile application of hydrogen fuel within a motorsport setting.

But how will it work? AFC CEO Adam Bond explains the ins and outs of XE's source of power, and how it'll work logistically with the upstart series. "It's the most common question we're asked," says Bond. "In simple terms, the bespoke charging system that AFC Energy has developed for Extreme E is made up of four primary components: the fuel production, alkaline fuel cell, a battery storage unit, and the charger itself.

"In the days leading up to each race weekend, hydrogen will be generated from a combination of portable solar arrays powering electrolyzers. The hydrogen generated will be stored in low pressure ►



metal hydride cylinders ready for use over the weekend. For the race, our fuel cell will utilise the green hydrogen to generate clean power, which will then be capable of being fed into each of their ODYSSEY 21 race vehicles via a battery storage unit to buffer power in order to meet peak charging times between races.”

Bond reveals that discussions regarding a partnership with Extreme E began in January 2020. “What was also clear at that point,” he continues, “was the need to agree a bespoke specification and design with them given the varying conditions and challenging logistics of the series – from the heat of the desert, to the cold of Greenland, and then the high altitude of Tierra del Fuego! Our system therefore provides zero-emission, off-grid power that can be deployed in a range of climatic conditions.”

Of course, where green energy often has the propensity to contradict itself is in the power used to develop those solutions. In the UK in 2020 (up to the third quarter, according to government figures), 40.2% of power was accounted for by renewable sources, but that still leaves 59.8% using non-sustainable sources to build or supplement those renewable sources. There will eventually be a crossover in those figures, but as it stands there is a rising reliance on natural gas for power.

In the electric series that exist, the plug-in nature of powering up batteries still produces emissions, even if Formula E’s Aquafuel glycerine source has cut those emissions from diesel. But XE has built on that with the hydrogen fuel cell to take emissions to near-negligible levels, with a view to showcasing AFC Energy’s technology and helping the company develop its products. Within that is

“Growth of renewable sources should have the potential to change the face of motorsport forever”



a key component of the modern-day motorsport partnership – aligning yourself with a championship to accelerate a product’s development.

“Extreme E needed a zero-emission power system to charge their ODYSSEY 21 vehicles to tie with the purpose of the series, and our H-Power fuel cell provided the perfect base technology to deliver it,” says Bond. “The system therefore removes the need for diesel generators to power the cars, significantly reducing emissions while providing a global platform to showcase the charging technology.

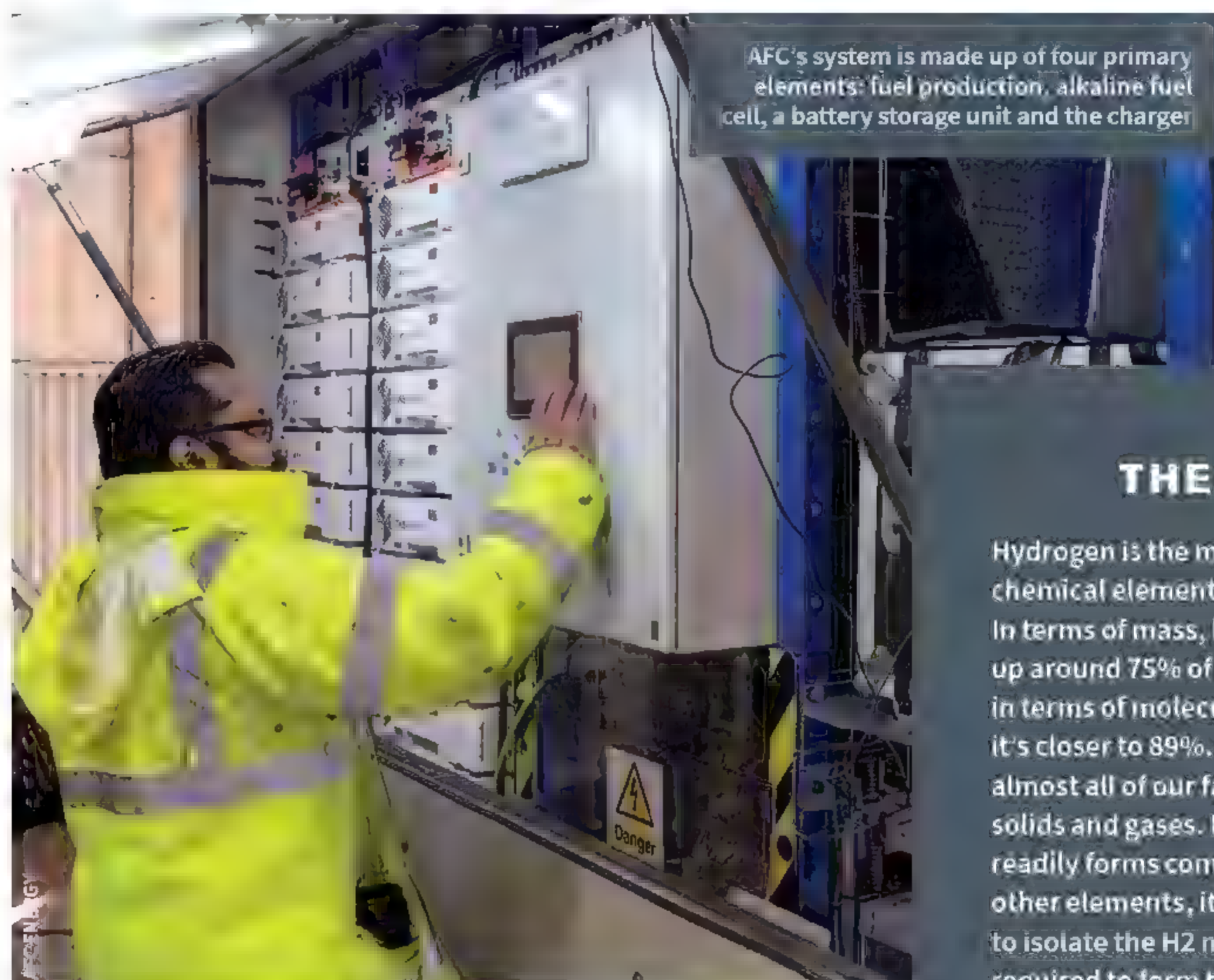
“As a twist for the Extreme E series however, AFC Energy is also configuring an upstream fuelling element. At each



race location, we will be creating the hydrogen fuel on site in the days leading up to the race, using a combination of electrolysis and renewable solar power such that not only is the fuel cell zero emission, but so too is the manufacture of the hydrogen fuel. This is a world first in the off-grid powering of sporting events.”

Motorsport is at a crossroads. After being powered by fossil fuels for so long, series have branched off into hybrid formulas (such as F1, and soon to be British Touring Cars and the World Rally Championship), and battery-electric series such as FE, with HYRAZE’s proposed full hydrogen fuel cell-powered fleet of cars on the horizon. For now, XE will bridge that gap between the latter two examples.

In the short term, the likes of F1 will increase the amount of biofuels



AFC’s system is made up of four primary elements: fuel production, alkaline fuel cell, a battery storage unit and the charger

THE POWER OF HYDROGEN

Hydrogen is the most abundant chemical element in the universe. In terms of mass, hydrogen makes up around 75% of everything, but in terms of molecular quantity, it’s closer to 89%. It forms part of almost all of our favourite liquids, solids and gases. But because it readily forms compounds with other elements, it’s very hard to isolate the H₂ molecules required to form the hydrogen

fuel. This is usually done via the electrolysis of water.

Electrolysis uses a positively charged anode and a negatively charged cathode in a solution, separated by a permeable membrane, to form new chemical compositions. At the anode, the hydrogen and oxygen split to form hydrogen ions, free electrons and oxygen. The H⁺ ions and electrons then join forces to form H₂ gas to



Extreme E's ODYSSEY 21 off-landers will highlight effects of climate change

present within the fuel that each car uses. A switch to E10 fuels in 2022 will precede the desired move to complete biologically replaced products for 2026 and beyond, creating another technological battleground to help the world's petrochemicals giants produce fuels with greater efficiency. But even so, there will come a time where fuels containing pollutants become even more unfashionable, and XE's and AFC's combined aspirations to steal a march on the popularity of hydrogen is evident.

"Top-flight motorsport in the past has been dominated by considerations on power, weight and aerodynamics, with the combustion engine at its very centre," Bond explains. "Since the inception of Formula E, how vehicles are powered is now a material consideration for series around the world. I think there has been

a realisation that, with the growth of hybrid and EV products 'on the road', there needs to be further outlets to showcase the technology on the track or off-road. Extreme E has responded to that challenge, and I think it will encourage the creation of new all-electric race or rally championships across the world."

And, Bond reasons, the growth of renewable sources should have the potential to change the face of motorsport forever. "I think motorsport is already in the process of adapting itself," he says. "Clear progress has been made in the past few years through Formula E, the use of hypercars at Le Mans, and Formula 1 setting its overall green objective to move towards a net-zero carbon footprint, with all power units to be fuelled by fully advanced, sustainable fuels by 2030.

I think Extreme E's inaugural season will further accelerate this transition."

Although hydrogen is clearly going to be an attractive future propulsion source, problems do lay in creating hydrogen gas, storing it and ensuring that it remains affordable. On a small scale, XE has the means to do so, but a bigger achievement will be the series' ability to help energy companies upscale their operations to allow for a greater quantity of applications worldwide. It's not as simple as just snipping off a few molecules away from water; ironically, it requires a lot of energy to pull it off. But if motorsport can help to make those advances, then XE and AFC will have played an admirable part in that.

With hydrogen finally making its way into motorsport, the winds of change are surely picking up pace. ■

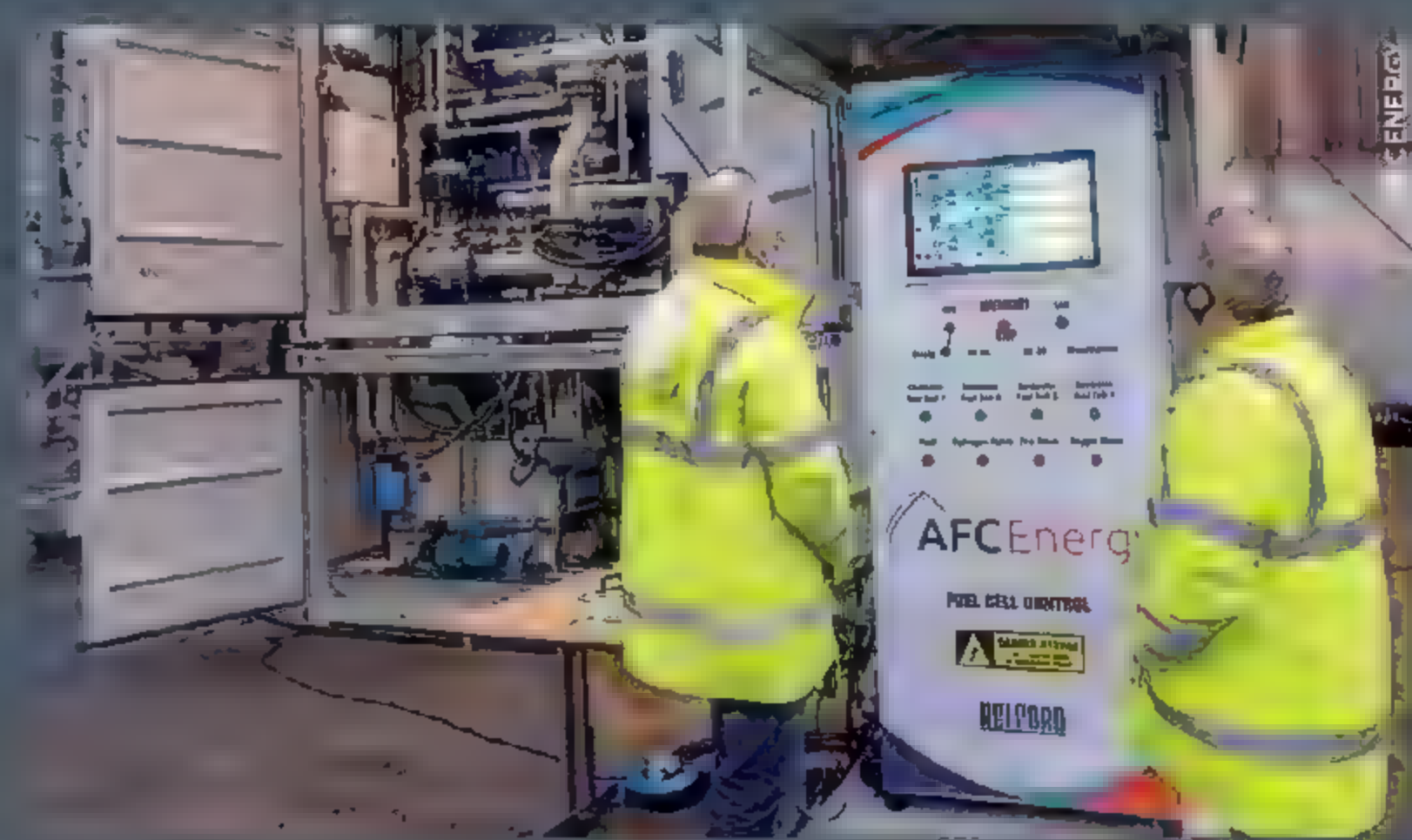
be packed up and used in a fuel cell.

A hydrogen fuel cell takes the hydrogen molecules and breaks them again into hydrogen ions and electrons. The electrons generate the current required to develop an electrical charge, which can be stored by the car's batteries. The hydrogen ions then recombine with the electrons and with oxygen to create water as its sole byproduct. That water, theoretically, could be used again in an electrolysis reaction to reclaim the hydrogen

gas, or used elsewhere.

Although there are many different types of fuel cell, they all generally work on that principle, and multiple cells can be combined in various ways to deliver different levels of current or voltage, depending on the purpose.

For XE, this is done externally to plug in and charge the batteries on the car, but future hydrogen-electric cars will have an onboard fuel cell and a hydrogen tank to produce that reaction internally.



BRINGING SOLBERG'S STEED BACK TO LIFE

With painstaking attention to detail, Prodrive's new Legends department has completed its first restoration project – and is busily gearing up for more

BY MATT KEW

Toyota, Subaru and Mitsubishi passed around the baton for Japan to win a mighty seven World Rally Championship manufacturers' crowns in a row between 1993 and 1999. Yet the Land of the Rising Sun would wait another five years before making its debut on the WRC calendar. Little wonder, when that time came, that so many of Subaru's top brass turned out to watch their reigning champion Petter Solberg take to the rough stuff on the island of Hokkaido.

The Norwegian needed to bounce back aboard his Impreza S10, having suffered a massive crash on the preceding Rally Germany to cause a third straight retirement. His response for the inaugural running of Rally Japan in 2004 was emphatic. He and co-driver Phil Mills carved out a 10-second cushion on the opening Yam Wakka route alone and ruled the roost from there. Over the remaining 26 narrow and high-speed gravel stages, they pulled out an eventual 1m13.3s margin to the Citroen Xsara of Sebastien Loeb in second place.

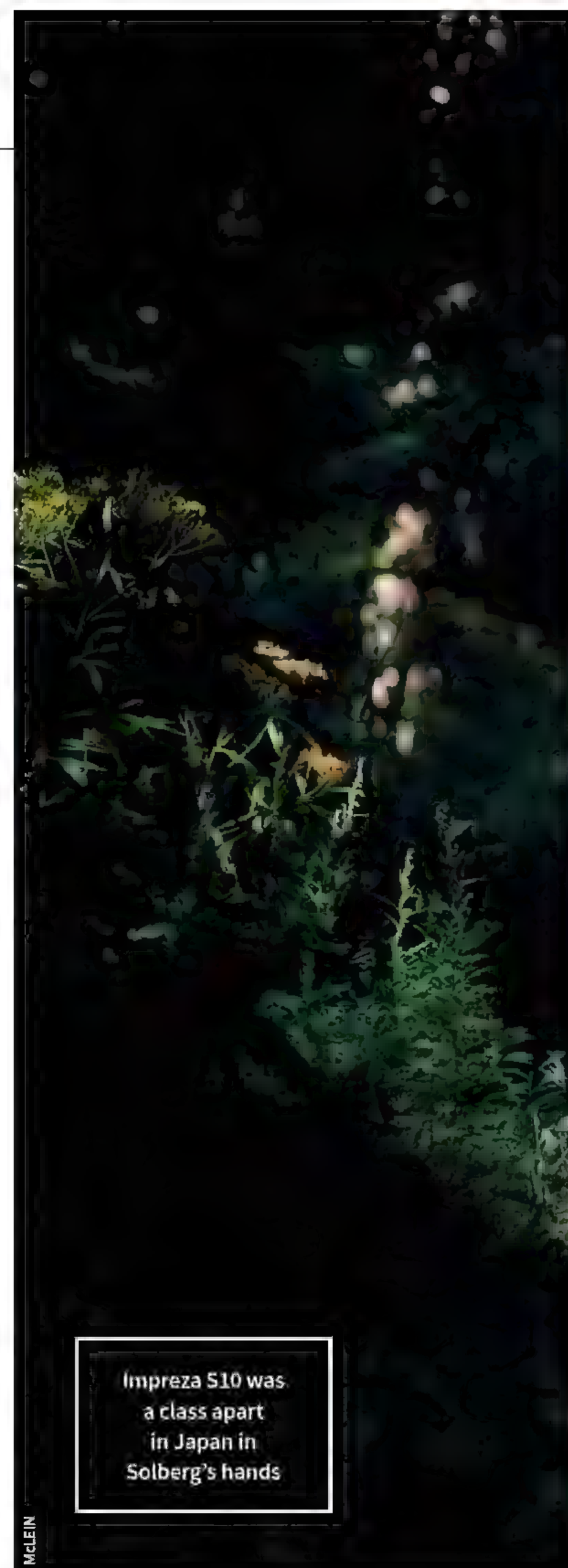
That triumph represented the eighth of Solberg's 11 WRC wins and the 42nd for Subaru on what was "probably the most important single rally we've ever done", said the manufacturer's team principal David Lapworth at the time.

Whereas persistent gearbox unreliability stymied the attack of the Peugeot 307s in Japan, Solberg and his Impreza ran without fault. The reward for that car, chassis

04008, was a full strip and rebuild at Prodrive's Banbury base. It was then freighted to Australia for the season finale. Down under, Solberg clattered a rock and broke the steering to slide into retirement. After that unceremonious end to its top-flight service for the works team, over the next 15 years 04008 ended up in the hands of privateer squads and private ownership.

In that time, Andy Brown was re-recruited by Prodrive as its heritage projects manager to lead the team of technicians behind the fresh-faced Legends operation that specialises in restoration. Brown first worked with company founder David Richards in 1986, fettling Porsche 911s at the original Silverstone headquarters to do battle in the Middle East Rally Championship. He then looked after the BMW E30 M3s, with driver Bernard Beguin leading the charge in France, Patrick Snijers plying his trade in Belgium and Italy, while Ari Vatanen was at the wheel for the 1000 Lakes Rally in 1988. Stints with General Motors, Ford and with multiple national rally champion David Higgins took Brown to the US and Australia before Paul Howarth, a 30-year Prodrive veteran and current operations director, asked him back to Oxfordshire.

Come 2019, a Dutch collector was on the phone to Prodrive, wanting to buy a car with a winning history. Chassis 04008 was located in Ireland and brought over for an exacting rebuild, the completion laying the groundwork



Impreza S10 was a class apart in Japan in Solberg's hands

McLEIN



Solberg and Mills celebrate Subaru's home win with team boss Lapworth

SUTTON/MOTORSPORTIMAGES

for the full launch of Prodrive Legends.

"We did the S10 as a case study to see how the process went and whether it was something we wanted to pursue," Brown says. "So many people have got ex-Prodrive cars sitting around. Now they know we offer this Legends service, and the way the market has gone and the value of the cars, it's really worth investing in restoration."

The first part of the Prodrive Legends service is to verify the car and its life story. In a world where provenance goes a long way to dictating price, some have been known to spuriously fabricate Colin McRae competition history. Brown and his small team have already carried out 10 of these 'lie-detector tests' and have another 15 on the books. From that they can determine the precise specification of the car in question, and then make sure it tallies with all the original build sheets that have been retained. As Brown explains: "All those documents and transport and movement



schedules are noted in the customer's full report, which is just adding to the value of the car and guarantees its authenticity."

Prodrive Legends sent the good news to the Netherlands that the owner was in fact dealing with Solberg's pukka Impreza, and so came the green light for the full restoration, with instructions to return it to the crowning Japan set-up. The shell, 15% lighter than its 2003 predecessor to provide a lower centre of gravity, was stripped and shotblasted to reveal any body repairs that might be required. Luckily, cosmetic touch-ups were the order of the day – a fair reflection of 04008's continued use in national rallies over the years.

Not mistaking patina, which tells the life of a car, for plain old wear and tear, the stone-chipped underfloor and arches were retained. A fresh floorpan could have been made, but instead welding was done only where essential to ensure the S10 didn't morph into 'Trigger's broom'.

"The first part of the Prodrive Legends service is to verify the car and its life story"

Easing the first Prodrive Legends project, the Impreza had survived its life across the Irish Sea without being converted to left-hand drive, meaning no major adaptations to the cockpit or bulkhead. Then it was over to the jig to make sure the chassis was 100% straight before the process of piecing it all back together could begin.

The bucket seats were sent to Sparco in Italy to have the names of Solberg and Mills stitched into the backrests. Closer to home, the four-way adjustable Sachs suspension was crack tested, replated and built up with new bearings, bushes and

seals. The Alcon brake calipers were restored; the discs and original-but-leaky fuel cell replaced.

The wiring loom was also given the onceover. The TAG electronic control unit was state of the art, providing launch control to ensure the 1994cc four-cylinder EJ20 boxer engine could scarper off the line as Solberg and team-mate Mikko Hirvonen banged through the six-speed paddle-shift gearbox. But as Dickie Stanford, formerly of Williams Heritage, will attest with the protracted recommissioning of the FW14B, period electronics are particularly 'charming'. Gizmos from the 1990s and 2000s tend only to talk to laptops of the same vintage. Fortunately, they were in storage at Prodrive and could be dusted off for the Impreza. Brown adds: "We're lucky. We've got all the computers to be able to communicate with the car, to remap the engines if we want to make them more user-friendly." ►

Those were some of the sweeping brushstrokes for the restoration taken care of, but the true beauty was to be found in the details with 04008 as it came to wear its famous blue-and-fluorescent-yellow livery once again. Brown explains: “The car went over to the paint shop, and we’re lucky because we still use the same guy that painted them back in the day. The same graphics guy, too!”

“At that time there was a big push on weight-saving, so they didn’t use lacquer for 2004. When you’re looking inside the car, it looks really like a matte finish, but that’s how it was. The guys knew all of that for the restoration because they could remember it first-hand. It makes it so much easier. It’s authenticity over looks.”

“Not all Prodrive cars are like that. The early cars had the same paint inside as outside. For each car, we follow the build spec as closely as we can. We also had the correct aluminium and steel bolts for the door hinges.”

Prodrive Legends went further still in perfecting the minutiae. A Nokia 6310 phone, as Solberg used to communicate with the team in the service park back in 2004, was returned to the car. Howarth also dug out an example of the wooden

keyring — given by STI Japan personnel to Solberg and Mills as a lucky charm — so it could be added. As Brown reckons: “That’s one of the things that makes bringing cars to Prodrive Legends unique. No one else would know that.”

In a similar vein, the door pockets on 04008 have been positioned not to ‘generic’ Subaru Impreza WRC2004 spec, but to the placement preferred by Solberg specifically. A roll of tank tape has even

been thrown in, as used 17 years ago on Rally Japan to be affixed to the windscreen to block out any dappled sunlight poking through the forest trees. Sourcing a set of period tyres, harnesses and an original jack — even ensuring the pedal box and FIA camera housing on the roof are back to how they left the factory — seem like mere formalities by comparison.

All told, it’s taken a year for the restoration of 04008 to be completed,



Chassis 04008 won't be rallied — but expect follow-up projects to go public

Same staff carried out paint and graphics work as “back in the day”



but that's a bit of an unrepresentative timescale brought about by delays caused by the events of the past year. And in the final months since Christmas, Prodrive Legends has enjoyed equal space with the Dakar Rally programme in the workshop, with the race team crew chipping in when in need of downtime between events.

Rebuild complete, Prodrive Legends undertakes a shakedown of all the cars on the local Turweston airstrip, just over the hedge from the Bill Gwynne Rallyschool International. "We actually run all the cars before we strip them," explains Brown. "Then we can take the data out of it, analyse that and then when it's rebuilt, we do a full systems check, commission everything and we just run through it all as if we were preparing for an event."

While there are plans afoot for Solberg to be united with 04008, the owner doesn't intend to rally the finished S10. But Brown expects the subsequent S11 and Legacy restorations – with another two rebuilds in the pipeline – will get a run-out for Rallyday at Castle Combe and

appear at Goodwood in time.

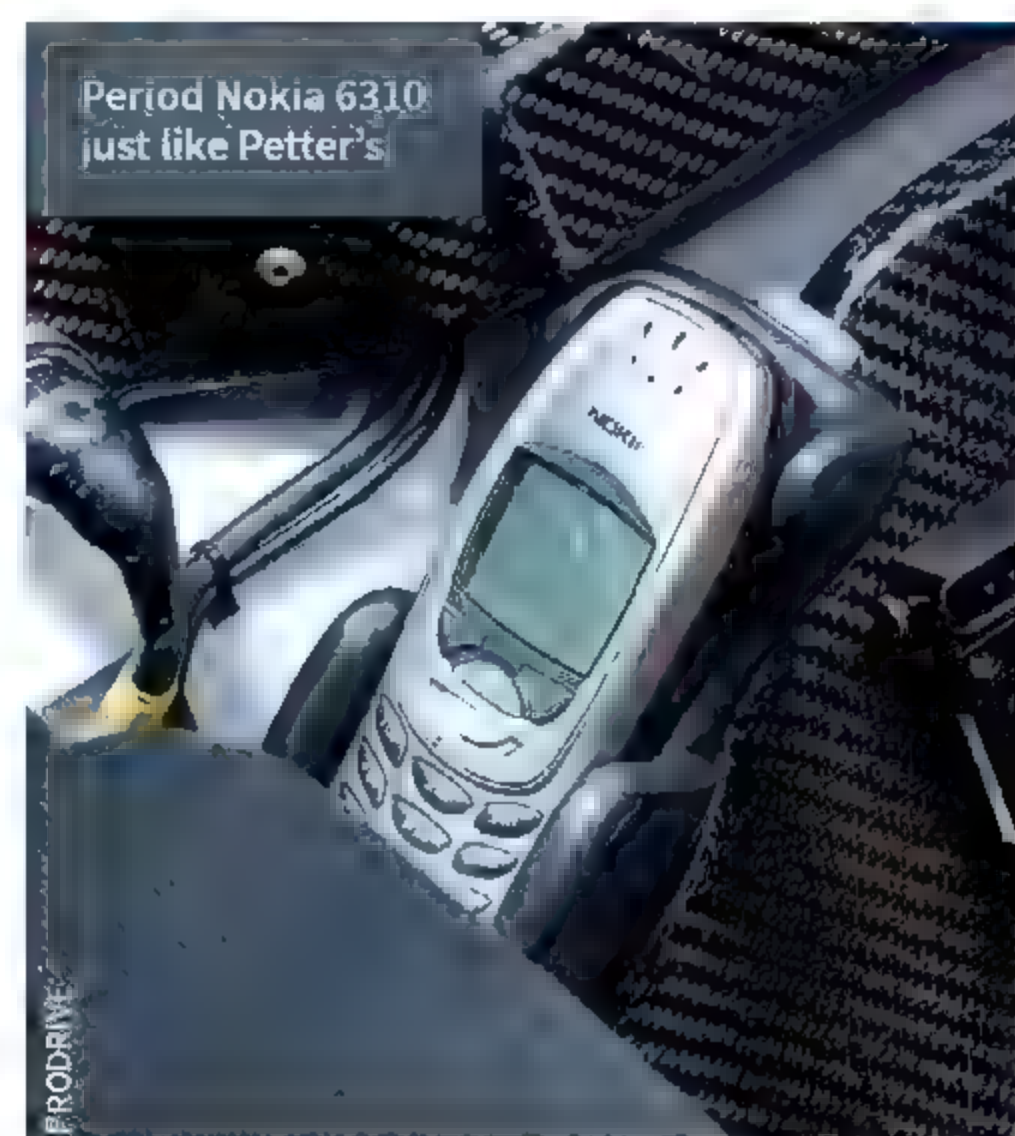
Such is the success of Prodrive Legends' initial foray that it's brought about slightly unexpected results. Brown and his team have been asked to travel to complete authenticity reports on cars that are being restored by rival services. Some customers have gone further and requested their non-Prodrive machines receive similar treatment. But with "several hundred" works cars built over the past 37 years, finding their whereabouts and building up the in-house database is the first priority.

Prodrive Legends has gathered pace away from the rallying world too. The advent of the Masters Endurance Legends series for 1995-2016 prototype and GT machinery has led to Aston Martin Vantage GTE cars resurfacing for a makeover. Likewise, a couple of V12s have been extricated from their 2001 Ferrari 550 GT1 housing

for a nip and tuck. Enquiries about recommissioning the E30 M3s that Brown originally worked on have also landed.

But Prodrive Legends is keen to avoid one of the tropes of historic racing. In a world where AC Cobras and Jaguar XK-engined kit thunder around the Goodwood Motor Circuit for the Revival several seconds faster than in their heyday, Brown and Howarth have little interest in chasing performance developments that are out of character.

"There's the technology out there to improve the cars," concludes Brown. "But no, because if we went off on a tangent, it's not really an original car, which is the whole premise behind Prodrive Legends. Think of it like kind putting new windows in your house: you're protecting your investment, but the blueprints haven't changed." ■





Klauser fills the boots occupied by Doug Fehan for over 20 years in managing Corvette Racing

MEET THE NEW BOSS

At just 34, Laura Wontrop Klauser is leading General Motors through a transitional phase in sportscar racing. Here's how she got into her dream role and what she plans to do with it

BY DAVID MALSHER-LOPEZ

There are some people who rise through a company so fast that, long before middle age, they end up at a level several times removed from what originally attracted them to the industry. Suddenly they're merely pen pushers, their enthusiasm dwindles and they end up occupying a job position rather than truly fulfilling a role.

That's not going to happen to Laura Wontrop Klauser who, at 34, has become General Motors' sportscar racing programme manager. True, she's not actually building the 5.5-litre V8s under the engine cover of the Cadillac DPi-V.R prototypes in the IMSA pits at Daytona or Sebring, but she's making the decisions pertaining to these cars, the Corvette Racing squad's C8.Rs, and the Chevrolet Camaro GT4.Rs that race in IMSA's Michelin Pilot Challenge.

Klauser is just fine with that because racing combines two of her greatest passions — mechanical engineering and competition. And she intends to be very cautious about getting too far away from

the hands-on activity. "It's a fine balance, it really is," she tells Autosport. "I think a lot of the leaders at GM probably miss the days when they were working on the cars."

"I've done a couple of different jobs at GM, some of them I've really loved, some were a lot more challenging, and I learned that I'm never going to pursue a job because someone said I should do it. I'm only going to pursue a job that I want to do, where I believe I can make a positive impact."

"Racing is a perfect fit for me. If there came a day when there was another perfect fit, it was a good challenge and I could help move something forward, then I would definitely consider it. But honestly, I'm loving life, I'm keeping so busy and I can't imagine going anywhere else."

Klauser grew up on a little farm in Long Green Valley in Maryland. She recalls her birthplace as "a little chunk of paradise" that proved fundamental in her eventual career path.

"I really got interested in cars around age 13 and the 'car' that I first learned to drive was actually a John Deere tractor!"

she says. "Being on a farm meant that you didn't just walk down to the end of the street to a 7-Eleven or a drugstore. You always had to get in a car to go anywhere, so having a car of your own meant independence and freedom to do what you wanted to do, when you wanted to do it."

"So I had to learn to drive — a real car this time! — as soon as possible. That started the passion for machinery and that's why I went into mechanical engineering: it caught my attention and it didn't let go."

Klauser first wanted to be a mechanic, but her talent for maths convinced a teacher that she should look into engineering.

"So I went, 'Oh, mechanical engineering? Best of both worlds,'" Klauser recalls. "Then when I went to college [at Rensselaer Polytechnic Institute], I was on the Formula SAE team where you design, build and race a formula car with your fellow students and that's when I fell in love with racing and the competition side of it."

Some of us in life immediately find the





right path, and Klauser was one such. “As a brand-new hire at GM, 21 years old, I was working on the Corvette production cars as my first assignment,” she smiles, “and I could not have been more excited. That was so cool.”

Initially Klauser’s remit involved working on suspension for GM’s mid-size and luxury models, helping to find noise/vibration/harshness solutions for the company’s small and compact cars. But as Cadillac switched from the CTS-V.R to the ATS-V.R in GT World Challenge Americas — then called the Pirelli World Challenge — the opportunity to head up the programme became vacant.

“I couldn’t not apply!” explains Klauser. “I felt it would be my dream job, and it was. And then I got to be programme manager for the DPi-V.R in IMSA — an even dreamier job. Now, of course, I have Cadillac and Corvette and I could not be more happy. This is everything I could have wanted out of my career. I’m pretty excited.”

Excited, yes, but well aware of the responsibilities ahead. She was in charge from the start of Cadillac’s DPi-V.R programme in 2016, and saw it win the first seven races after the IMSA SportsCar Championship introduced its Daytona Prototype international regulations for 2017. The car was so good that even

IMSA’s smartest regulators couldn’t cope with the demands of matching Caddy’s beast of an engine — a normally aspirated 6.2-litre V8 built by Earnhardt Childress Racing — with the smaller turbocharged units from the opposition, and requested a capacity reduction for 2018, hence the 5.5-litre unit used since. ►



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GTE Corvette needs “quite a bit of re-engineering” to be GT3-spec

Now the end is in sight for the DPi-V.R — which has amassed a total of 18 wins, including four consecutive Daytona 24 Hours triumphs — as the hybrid LMDh prototypes will be introduced for 2023. That’s a year later than originally planned, because of the knock-on effect of the COVID-19 pandemic. But Klauser says the DPi-V.R’s continuation in 2022 is entirely dependent on the appetite of the teams. Currently three Cadillacs race full-time, fielded by Action Express Racing, Chip Ganassi Racing and JDC-Miller Motorsports, with a second AXR car entered for the four endurance races.

“The way that our programme works is as a customer programme,” says Klauser. “We worked with Dallara to design the chassis, we worked with ECR to design the engine, but the teams buy the chassis from Dallara and lease the engines from ECR. We don’t dictate whether or not they race;

“If people are willing to talk to me to explain what’s wrong, that’s an advantage”

really it comes down to whether our teams want to continue into next year.”

And what about the LMDh regs? Klauser naturally plays her cards close, but says GM is assessing whether to retain IMSA programmes in both Prototype and GT classes or reduce its participation to just one class. “LMDh has caught our attention,” she says. “We’ve taken a good look at the rules, and what we’re doing now is looking through where we want to place ourselves in sportscar racing in its entirety.

“It’s a package deal in our mind, where

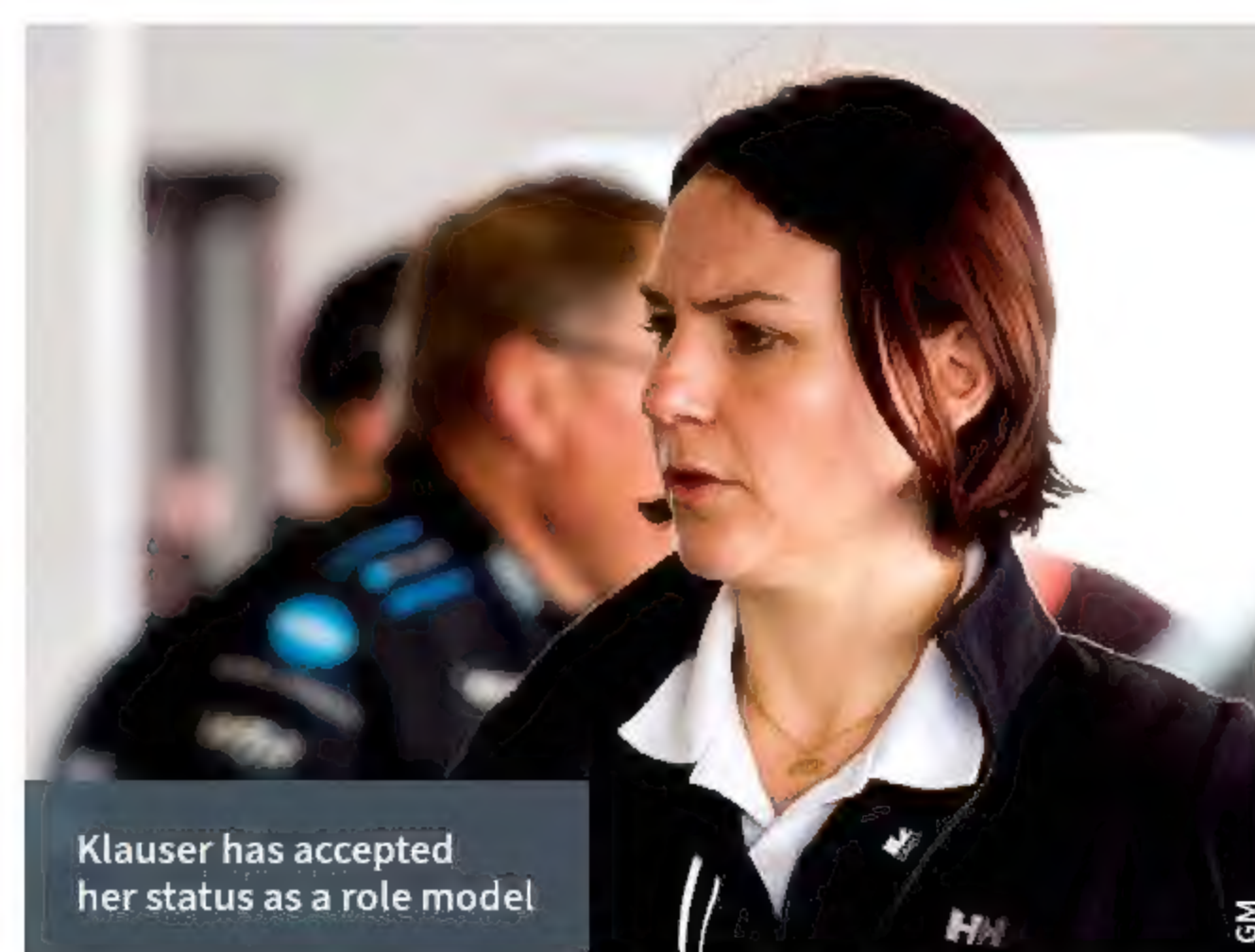
in the past it was a little bit separated — Corvette Racing was its own thing in GTLM, Cadillac was its own thing in Prototypes. Now it’s a different story, and LMDh has been very much part of the evaluation. Does it make sense to be there? What brand does it make sense to run?”

In any previous year, Corvette Racing would be assumed to be set fair to continue. But this will be the final year for IMSA’s dwindling GT Le Mans class, which has just three full-time entrants this year and will be replaced by GTD Pro for GT3 cars with all-Pro driver line-ups. The new-for-2020 C8.R dominated GTLM last year and will surely do so again this year, but Klauser points out that there are several aspects to consider before GM will commit to switching its GT efforts to a GT3-spec C8.R that could be run by both the works Corvette Racing squad and by privateers.

“There’s quite a bit of re-engineering to do to turn a car from GT Le Mans class into GT Daytona class,” she says. “It’s quite a different mentality to go down a customer platform route with a GT3 car than when you build a GTE car that you know is going to be factory-built and run.

“The decisions that you’d make for a factory team could be completely different from what you do for a customer. You have to pull a lot of cost out of something that you designed to be factory-run to make it affordable for the customer. I see it as likely being a brand-new programme.”

The day will come, hopefully not long from now, when gender doesn’t come into these interviews, but there is still work to be done before the populace at large is unsurprised by a woman holding a senior engineering-based role in motorsport.



Klauser has accepted her status as a role model

Klauser agrees, admitting that her stance on the matter “has changed quite a bit”.

“When I was in college, someone said to me that I only got into RPI because I was a girl, which was bull because I had a hell of a resume coming out of high school,” she says. “The last thing I wanted to do was feel ‘different’. I saw myself as an engineer and never wanted to talk about being female.

“But after a few years and now working with girls in high school and college, I know how important it is to understand the differences encountered by each gender. Thankfully, though, I don’t have any examples of when a door got slammed in my face or where somebody wouldn’t work with me because I’m a woman — partly because I just wouldn’t accept that!

“I think my feminine qualities mean I’m easy to talk to and approachable; many times, male team-mates will talk to me about something they wouldn’t dare tell another male team-mate. That works out well because I believe communication failure results in a lot of problems, so if people are willing to talk to me to explain what’s wrong, that’s an advantage whenever you need to get things solved. If that openness is because I’m a woman, then great. Whatever the reason, I will try to make all of us perform better as a team.” ■

HOW TO BE AN ACE ENGINEER

Steve Farrell is applying his 40 years of racing knowhow to the BTCC rough-and-tumble

BY JAMES NEWBOLD

With its trusty Mercedes machinery traded in for the British Touring Car Championship's first customer BMW 330i M Sports, Ciceley Motorsport will expect to be in the mix for regular wins in 2021. And while the battle-hardened Adam Morgan and Tom Chilton can be relied upon to get the job done on track, no less important will be the voice on the radio of a man who has worked with distinction across all levels of motorsport in a 40-year career spanning Formula Ford, Formula 1 and almost everything in between.

Australian-born Steve Farrell followed in the footsteps of older brother Chris in seeking to forge a racing career in England, but his 1983 Formula Ford campaign was hampered by a legacy of injuries he'd sustained in a crash the previous year. He instead turned to team management with his own Milldent Motorsport squad, which ran Perry McCarthy in 1985 and gave future Reynard designer Malcolm Oastler his first job, before deciding "not to stretch my luck" and selling up. He found employment as a race engineer for the Chamberlain Engineering Group C2 team, then settled at Tom Walkinshaw Racing, where he guided Teo Fabi to the 1991 world sportscar title.

After tin-top stints at Prodrive and RML, he returned to TWR as chief engineer on the Nissan Le Mans programme, before a call-up from Oastler in 1998 to assist with building up British American Racing. It had taken over Tyrrell's entry, but was to all intents and purposes an all-new team. "We were in Portakabins in Brackley until

the building was finished!" he recalls. "It was chaos for about 18 months."

The 1999 season was hard slog as poor reliability thwarted efforts to score points, but the promise was evident, with Jacques Villeneuve running third early on at the Spanish GP. But from those foundations, progress was slow – which Farrell blames on "stupidly heavy" Honda engines – and when David Richards arrived to replace the ousted Craig Pollock in 2001, he approached Farrell to oversee Subaru's World Rally Championship programme.

Although it was an entirely different discipline to anything he'd done before, Farrell thrived, and Subaru won the 2003 title with Petter Solberg, the only time Sebastien Loeb was beaten in his full-time WRC career. Farrell says the role of a chief engineer is more about understanding processes than fine details – "I didn't go there and pretend to know about gravel tyres" – regardless of the environment.

"Ross Brawn always used to say, 'I don't have to know everything about everything,

I just have to know enough to have an intelligent conversation with the guy who does'," says Farrell. "You don't need to know the specifics, you just need to know the process to get to the right answer."

Farrell has been freelance since leaving Subaru in 2007, working as technical director of the football-themed Superleague Formula single-seater series from its 2007 inception until its demise in 2011, and race engineered for several touring car teams in Britain and China, where he first met Morgan. While NGTC-spec BTCC cars don't have the complexity of their 1990s Super Touring antecedents, Farrell still relishes the challenge of finding the last performance differentiators to improve.

"It's that process of making it all joined up," he says. "The BTCC is about detail now, because everyone runs the same stuff roughly. So it's a matter of absolutely understanding every nut, bolt and spring on that car and have you optimised it? Identifying what's important and what's not is where that experience is useful." ■



Farrell heads up the engineering on Ciceley Motorsport's new BMWs



Solberg produced a mighty performance in Wales to give Subaru 2003 WRC title

HARDWICK/MOTORSPORT IMAGES

TOP TIPS

FOR ENGINEERS FROM STEVE FARRELL

- Try to build a broad knowledge of everything so that you can have semi-intelligent conversations and recognise when people are bullshitting.
- Do what's best, not what's easiest. That doesn't always mean spending money, it just means doing things to the very best that you have available.
- Volunteer for a Formula Ford team. Do that for six months and you'll get a feel for what the driver says, a holistic overview.

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